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CONFERENCE IN THE MATTER OF POLLUTION OF THE NAVIGABLE WATERS OF GALVESTON BAY AND ITS TRIBUTARIES. FOLLOWUP MEETING HELD AT HOUSTON, TEXAS ON DECEMBER 5, 1972

Environmental Protection Agency
Washington, D. C.

5 December 1972

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FOLLOWUP MEETING
OF THE
CONFERENCE
IN THE MATTER OF
POLLUTION OF THE NAVIGABLE WATERS OF GALVESTON BAY AND ITS TRIBUTARIES

held at
Houston, Texas
December 5, 1972

TRANSCRIPT OF PROCEEDINGS

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A followup meeting of the conference in the matter of pollution of the navigable waters of Galveston Bay and its tributaries, with specific reference to the Houston Ship Channel, was held at the Shamrock Hilton Hotel, Houston, Texas, December 5, 1972, commencing at 9 o'clock.

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PROCEEDINGS

OPENING STATEMENT

BY

MURRAY STEIN

MR. STEIN: The meeting is in session.

This meeting, called by the Environmental Protection Agency in cooperation with the Texas water pollution control authorities, is designed to follow up on our activities dealing with the pollution problem of the Houston Ship Channel. There have been two sessions of an enforcement conference in 1971 dealing with the situation. We had extensively explored the various aspects of the Houston Ship Channel pollution problem at that time, and as those people in the room who have been at those sessions of the conference will recall, we have had extended testimony and afforded everyone an opportunity for a full exposition of their views.

Among other things, we established load limits for the channel, various requirements for discharges, and established a technical committee to follow up with certain aspects of the problem.

In the interim, the Congress has passed extensive and new Federal water pollution control legislation, legislation under which we are now operating and which will have a

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tremendous impact on discharges into the waters of the United States of all sorts, municipal, industrial, and agricultural, and also a large impact on State programs and will involve a reordering and realignment of Federal and State programs in order to mesh and carry out the purposes of the new law.

Not the least of these will be the issuance of permits which will be required under the new Federal Act, and under that new Federal Act either the States will be given authority from the Federal Government to issue permits in accordance with certain Federal guidelines or in lieu of that the Federal Government will issue the permit, but in one way or another the municipalities and the industries will have to have one of these permits before they can discharge any material into the navigable waters of the United States. If they do so without such a permit, they will be violating the law and that will be a violation of Federal law as well as State law.

I think it is fair to say that the new legislation was designed to be a tightening up of water pollution control requirements throughout the country. It is also fair to follow through that as a corollary that the new legislation did not intend by specific word, legislative history or implication to state that any agreement that had been reached previously, time schedule or anything of that sort, would be made more lenient by virtue of the new legislation.

The purpose of this meeting, therefore, is to try to determine the progress we have made since the last conference, to determine what the technical committee has come up with in its evaluation, and significantly determine how we and the State of Texas together are going to move forward with the new Federal legislation in order to achieve cleaner waters for Texas and the Nation.

We would like to have, as we always have had, full participation by anyone who would like to make a statement. I should indicate, though, that in view of the extensive, and really extensive, proceedings we have had before we expect to conclude this meeting today and we certainly would not expect to go beyond 5 o'clock this afternoon.

Now, if anyone in the audience would want to make a statement, will you please put your name on a piece of paper or a card and get it up to me here with an estimated time that you are going to speak. Hopefully we will be able to accommodate everyone, but if necessary in order to meet the time schedule I may suggest that some of the people take a little less time to make their statements. I think that if we all cooperate we can get this program under way and we can bring out any unresolved issues without taking an extraordinary amount of time to do this. Let me assure you, we are not here to cut anyone off and if there are any special problems we will be glad to entertain them.

At this point I would like to take the opportunity of introducing the two distinguished colleagues I have with me on the panel, although neither one of them needs an introduction.

To my left is Mr. Hugh Yantis, who has long been Mr. Water Pollution Control in the State of Texas and one of the most distinguished professionals in the entire country in the field of water pollution control.

And to my right is Mr. George Alexander, the Deputy Regional Director for this regional office of the Environmental Protection Agency, with headquarters in Dallas.

At this point I would like to call on Mr. Alexander for the Federal presentation.

Mr. Alexander.

MR. ALEXANDER: Thank you, Mr. Stein.

I would like to call on Mr. Tom Gallagher to present a report on the proceedings in this matter through April of 1972. Mr. Gallagher is the Director of the Environmental Protection Agency's National Field Investigation Center in

Denver, Colorado, and a member of this technical committee.

Tom.

THOMAS P. GALLAGHER, DIRECTOR

NATIONAL FIELD INVESTIGATIONS CENTER

DENVER, COLORADO

MR. GALLAGHER: Thank you, Mr. Alexander.

Mr. Chairman, conferees. I am going to present portions of a report titled, "Progress Report on Recommendations of the Galveston Bay Enforcement Conference." I would like the entire report entered into the record as if read.

MR. STEIN: Without objection, that will be done.

(The above-mentioned report follows:)

PROGRESS REPORT
ON
RECOMMENDATIONS
OF THE
GALVESTON BAY ENFORCEMENT CONFERENCE

BY

GALVESTON BAY TECHNICAL COMMITTEE

TEXAS WATER QUALITY BOARD

AND

ENVIRONMENTAL PROTECTION AGENCY

October 1972

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I

INTRODUCTION

The Galveston Bay Technical Committee was formed by the Conferees' of the Galveston Bay Enforcement Conference at the conclusion of the first session in June 1971. The Technical Committee summarized testimony offered at the first session and the Conferees adopted recommendations at the second session in November 1971. Many of these recommendations require periodic submittal of progress reports prior to the time of full implementation. In accordance with these recommendations, the Galveston Bay Technical Committee submits this first progress report.

Recommendations Number 4, 5 and 11 concerned adequate criteria and sampling of shellfish harvesting areas to insure acceptability of the product for consumption. The Food and Drug Administration has initiated a nationwide sampling and analysis program to determine the toxicological significance of oil and hydrocarbon residues in oysters. Preliminary data from this survey are not yet available for general distribution. The Texas State Board of Health and the Food and Drug Administration have amended the sampling schedule in Galveston Bay to include, as far as possible, data collection under the most unfavorable hydrographic and pollution conditions. Alert levels proposed for heavy metal concentrations in shellfish at the Food and Drug Administration Seventh National Shellfish Sanitation Workshop were not adopted. A committee has been formed to study the problem and review available data at yearly intervals.

Recommendation No. 6 concerned effective disinfection of municipal effluents and the centralization of sewage treatment plants. Grab samples of effluents from 50 major municipal waste plants collected by the Texas Water Quality Board in March 1972, indicated that a large number of the plants were meeting the Texas Water Quality Board chlorine residual requirements. However, total and fecal coliform concentrations in the effluents of many plants were still excessive. Total and fecal coliform are indicators of the possible presence of pathogenic organisms. In general, those plants with larger contact times discharged effluent with satisfactory bacteriological quality. In general, the unsatisfactory bacteriological densities are related to either excessive solids concentrations in the effluent, or short circuiting in the chlorine contact tank, or both. Correction of the problem is being pursued on a case by case basis by the Texas Water Quality Board. The Sims Bayou plant of the City of Houston is the only major municipal waste source without chlorination facilities. These facilities will be constructed and in operation by December 1972.

With respect to the centralization of sewage treatment plants and the elimination of small facilities, the Texas Water Quality Board has issued an order to the City of Houston requiring the abandonment of a number of obsolete plants and the diversion of these wastes to regional and sub-regional systems. The Clear Lake area has also received a Texas Water Quality Board order with the same objective. Compliance with these Texas Water Quality Board orders is mandated before December 31, 1974.

Recommendation No. 7 called for a joint waste source survey of the Galveston Bay area by the Environmental Protection Agency and the Texas Water Quality Board, in addition to other ongoing studies. This survey commenced during April 1972. It is presently anticipated that approximately one-half the waste effluent flow to the Houston Ship Channel will have been analyzed by October 1972. Results will be provided to the Conferees as soon as they become available.

Recommendation No. 8 called for the requirement of best reasonable available treatment to minimize discharges of oil and grease. Texas Water Quality Board permits are being amended to require oil and grease concentrations in waste effluent to be not greater than 10 ppm.

Recommendation No. 9 called for a continuing reduction of waste loads and amendment of Texas Water Quality Board permits to reflect these reductions. Under present abatement schedules, the waste load to the Houston Ship Channel will be reduced to about 60,000 pounds per day of biochemical oxygen demand (BOD) by December 1973, from the present 100,000 pounds per day. The major waste sources in the Texas City area will be reduced from the present 78,000 pounds per day to 13,800 pounds per day in 1974 to 11,800 pounds per day in 1976.

Recommendation No. 10 called for an evaluation of the organic sludge problem in the Houston Ship Channel with specific emphasis on the development of suitable dredged spoil disposal areas. Examination of bottom deposits by Texas A&M University showed highly organic material and represents an important pollutional source. Some analyses indicate that the Channel deposits contain material toxic or inhibitory to microorganisms. EPA and the U. S. Army Corps of Engineers have proposed the construction of a ringed diked spoil area on Atkinson Island. Further studies of the environmental impact of this proposal are advisable.

Recommendation No. 12 required an assessment of feasible processes to accomplish color removal from waste sources. The Committee decided that, although several ongoing research studies on color removal indicated promising results, the technology was still not sufficiently developed to require color removal processes be installed at the present time. The Texas Water Quality Board permits do specify that such processes will be installed when technological feasibility for general use is demonstrated.

Recommendation No. 13 states that: "To meet present official State-Federal water quality standards established for dissolved oxygen in the Houston Ship Channel, it is expected that the maximum waste load discharged from all sources will be about 35,000 pounds per day of five-day BOD, including projected future development. The Texas Water Quality Board in cooperation with technical personnel of the EPA shall review existing waste discharge orders with the objective of allocating allowable five-day BOD waste loads for sources discharging to the Houston Ship Channel such that the probable 35,000 pounds per day maximum shall not be exceeded." Such an allocation was made by the Technical Committee and presented in a public hearing by the Texas Water Quality Board in Baytown, Texas in February 1972. Major opposition to these allocations was voiced at this hearing. The Texas Water Quality Board is conducting an abatement program that will attain a total B.O.D. effluent level of approximately 60,000 pounds per day by December 1973. During this period, consultations will be held between the Texas Water Quality Board and the Environmental Protection Agency with individual waste dischargers to determine specific implementation dates by these waste sources for meeting Federal-State water quality standards for the Houston Ship Channel. The present program of limiting effluents to 60,000 pounds per day is an interim step and may not meet presently approved State-Federal water quality standards for dissolved oxygen in the Houston Ship Channel.

Recommendation No. 14 directs an allocation of allowable waste loads to Galveston Bay and all other tributary areas. The Clear Lake area has received a Texas Water Quality Board order requiring the abandonment of obsolete plants and the diversion of these wastes to regional and sub-regional systems. The major waste sources in the Texas City area will be reduced from the present 78,000 pounds per day to 13,800 pounds per day in 1974 to 11,800 pounds per day in 1976. The City of Galveston has been directed by a Texas Water Quality Board order to make extensive improvements in the collection system and to provide expanded treatment facilities by December 31, 1974.

Representatives of the Galveston Bay Technical Committee are:

Texas Water Quality Board:

Joe Teller - Formerly Deputy Director*

Dick Whittington - Director, Field Operations

Robert Fleming - Director, Central Operations

Environmental Protection Agency:

Thomas Harrison - Region VI, Dallas, Texas

Malcolm Kallus - Region VI, Dallas, Texas

Thomas P. Gallagher - National Field Investigations
Center-Denver, Colorado

* - Mr. Tellers' position on the Technical Committee has been assumed by Mr. Tim Morris Chief, Field Support Section, Field Operations Division of the Texas Water Quality Board.

II
SUMMARY OF CONFERENCE
(FIRST SESSION)
POLLUTION OF THE NAVIGABLE WATERS OF GALVESTON BAY AND ITS TRIBUTARIES

June 7-12 and November 2-3, 1971

The Administrator of the Environmental Protection Agency, in accordance with section 10 of the Federal Water Pollution Control Act, as amended (33 U.S.C. 1160), and his finding that substantial economic injury results from the inability to market shellfish or shellfish products in interstate commerce because of pollution, and the action of Federal, State, or local authorities, on April 13, 1971, called a conference in the matter of pollution of the navigable waters of Galveston Bay and its tributaries (Texas). The conference was held June 7-12, 1971, at the Rice Hotel, Houston, Texas, and reconvened on November 2-3, 1971, at the Shamrock Hilton Hotel, Houston, Texas.

Galveston Bay is located in southeastern Texas on the Gulf of Mexico about 25 miles southeast of Houston, the largest city in the State. The Galveston Bay estuarine system, consisting of four large bays, Galveston, Trinity, East, and West Bays, and numerous smaller bays, creeks and bayous, has a total surface area of about 533 square miles and is the largest estuary on the Texas coast. The combined shoreline totals 245 miles.

The following conferees representing the State water pollution control agency and the Environmental Protection Agency participated in the conference:

TEXAS

Hugh C. Yantis, Jr.	Executive Director Texas Water Quality Board Austin, Texas

ENVIRONMENTAL PROTECTION AGENCY

Richard A. Vanderhoof	Director, Enforcement Division Region VI Environmental Protection Agency Dallas, Texas
Murray Stein, Chairman	Chief Enforcement Officer - Water Environmental Protection Agency Washington, D. C.

The Chairman of the conference pointed out that:

1. Under the Federal Water Pollution Control Act, as amended (33 U.S.C. 1160), pollution of interstate or navigable waters which endangers the health or welfare of any persons is subject to abatement under procedures described in section 10 of the Federal Act.

2. Under the provisions of section 10 of the Act, the Administrator of the Environmental Protection Agency is authorized to initiate enforcement procedures when he finds that substantial economic injury results from the inability to market shellfish or shellfish products in interstate commerce because of pollution subject to abatement under the Act, and action of Federal, State, or local authorities.

3. The first step of these procedures is the calling of a conference.

4. The purpose of this conference is to bring together representatives of the State water pollution control agency and the Environmental Protection Agency to review the existing situation and the progress which has been made, to lay a basis for future action by all parties concerned, and to give the State, localities, and industries an opportunity to take any indicated remedial action under State and local law.

In light of conference discussions, the following conclusions and recommendations were reached by the conferees:

1. The Federal conferee concluded that there is occurrence of pollution of interstate or navigable waters due to discharges from municipal and industrial sources subject to abatement under the Federal Act.

The State conferee took the position that the conference was called under the shellfish provisions of the Act and that while there is pollution occurring in the waters covered by the conference, it has not been demonstrated that substantial economic injury results from the inability to market shellfish products in interstate commerce.

2. While measures have been taken to reduce such pollution, they are not yet adequate.

3. Delays encountered in abating the pollution have been caused by the enormity and complexity of the problem.

4. The Food and Drug Administration, in cooperation with appropriate State regulatory agencies, will continue its recently initiated national study of oil and hydrocarbon residues in oysters, including those taken from Galveston Bay, with the objective of determining toxicological effects, if any, of such concentrations. These data, and any evaluations, will be made available to the conferees of the Galveston Bay enforcement conference.

5. To insure that approved shellfish harvesting areas are properly classified at all times, sampling for determining bacteriological acceptability of areas for shellfish harvesting in Galveston Bay shall continue to emphasize the most unfavorable hydrographic and pollution conditions. The most unfavorable hydrographic and pollution conditions will be determined by technical personnel of the Texas State Health Department, in cooperation with the Food and Drug Administration and other Federal and State and local agencies.

6. Effective disinfection of all waste sources contributing bacteriological pollution to the Galveston Bay system will be provided. The Texas Water Quality Board policy to this effect shall continue to be implemented. Where effective disinfection is not presently being accomplished, it is recognized that adequate measures are underway

to secure that disinfection. These measures shall be effective by December 31, 1971.

The Texas Water Quality Board will continue to implement its policy requiring the elimination of small plants. The centralization of facilities, wherever possible, and the halt of proliferation of small plants will continue, consistent with existing appropriate procedures. The implementation schedule for this program, as initiated by the Texas Water Quality Board, will be made available to the conferees of the Galveston Bay enforcement conference not later than April 1, 1972.

7. The Environmental Protection Agency and the Texas Water Quality Board will cooperate in a study of Galveston Bay. This study is presently being conducted by the Texas Water Quality Board on all sources of municipal and industrial wastes permitted by the Texas Water Quality Board to discharge effluent to Galveston Bay and its tributaries. These examinations shall emphasize determination of complex organic compounds, heavy metals and other potentially toxic substances, as well as oil and grease, from each waste source. Recommendations and scheduling of necessary abatement will be provided to the conferees as soon as they become available. The Texas Water Quality Board permits and self-reporting data system will be amended, as necessary, to reflect the recommendations of this waste source survey. A progress report on results of this study will be made to the conferees within six months of the date of the reconvened session of the Galveston Bay enforcement conference.

8. The Texas Water Quality Board will continue its review of each waste source discharging to Galveston Bay and its tributaries, and will

amend those permits as necessary to insure that the best reasonable available treatment is provided relative to discharges of oil and grease. The Texas Water Quality Board will cooperate with EPA and local governments in determining what treatment is the best reasonable available treatment. It is recognized that improvements in technology will be incorporated into future permit revisions. A progress report will be made to the conferees within six months of the date of the reconvened session of the Galveston Bay enforcement conference.

9. The ongoing review and amendment by the Texas Water Quality Board of existing permits recognizes that greater reductions of waste will be required of waste dischargers to the Galveston Bay system to meet water quality standards. The conferees note that in the past three years the organic waste load being discharged into the Houston Ship Channel has been lowered from about 430,000 pounds per day of BOD to 103,000 pounds per day of BOD. Any amendments to existing or new Texas Water Quality Board waste control orders as a result of this program will prohibit dilution as a substitute for treatment. A progress report on continuing reduction of waste loads will be provided to the conferees within six months of the date of the reconvened session of the Galveston Bay enforcement conference.

10. A characterization and evaluation of the water quality significance of materials from pollution sources contained in the organic sludge dredged from the Houston Ship Channel shall be conducted. Based on the results of this evaluation and examination of present spoil disposal areas, recommendations will be made by the Texas Water Quality

Board and the Environmental Protection Agency on location of suitable spoil disposal areas and other appropriate action to minimize or eliminate deleterious effects on water quality.

11. If alert levels for acute and chronically toxic or growth inhibiting factors are developed by the Food and Drug Administration for shellfish from all approved national growing waters, including Galveston Bay, the appropriate Texas agencies and the Environmental Protection Agency, in cooperation with the Food and Drug Administration and other appropriate Federal agencies will work to develop requirements for the same characteristics in waters approved for shellfish harvesting.

12. Chemical constituents causing color in waste effluents, such as those from pulp and paper mills, shall be reduced to natural background in area waters as soon as practicable as stated in existing Texas Water Quality Board waste control orders. A report on feasible processes to accomplish this recommendation shall be submitted to the conferees within six months of the reconvened session of the Galveston Bay enforcement conference.

13. [To meet present official State-Federal water quality standards established for dissolved oxygen in the Houston Ship Channel, it is expected that the maximum waste load discharged from all sources will be about 35,000 pounds per day of five-day BOD, including projected future development. The Texas Water Quality Board in cooperation with technical personnel of the EPA shall review existing waste discharge orders with the objective of allocating allowable five-day BOD waste loads for sources

discharging to the Houston Ship Channel such that the probable 35,000 pounds per day maximum shall not be exceeded.] A report will be made to the conferees on the results of this review by April 1, 1972. The allocation for each waste source as determined by the Texas Water Quality Board, in cooperation with the EPA, shall be attained by December 31, 1974. Interim dates to determine progress toward compliance of the assigned allocation shall be established for each waste source by May 1, 1972.

The conferees also recognize that discharge of other waste constituents shall as, but not limited to, chemcial oxygen demand, suspended solids, complex organics, and other toxic materials also contribute to the pollution of Galveston Bay and its tributaries. An allocation of allowable waste discharges for these pertinent parameters from each waste source will be established by technical personnel of the Texas Water Quality Board and the EPA consistent with best available treatment practices and such allocation will be reported to the conferees by September 1, 1972.

The conferees recognize that technical considerations may require a reassessment of this schedule in the case of some of the municipal and industrial waste sources to be considered. These necessary reassessments will be determined by technical personnel of the Texas Water Quality Board and the EPA, and recommendations concerning schedule changes will be made to the conferees at six month intervals.

The foregoing recommendations shall not be construed as in any way foreclosing or interfering with Federal, State or local statutory proceedings relating to the authorization, amendment, or revocation of

Federal or State waste discharge permits or orders, nor shall such recommendations operate to delay or prevent the creation or operation of regional waste disposal systems such as the contemplated Gulf Coast Waste Disposal Authority.

14. All waste sources which discharge directly to Galveston Bay and other tributary areas, including Clear Lake, shall have allowable waste loads allocated by June 30, 1972, consistent with best available treatment practices. This allocation shall include interim dates for accomplishment of required waste treatment and/or waste treatment facilities which will be in operation by December 31, 1974. The Texas Water Quality Board will cooperate with EPA and local governments in determining what treatment is the best reasonable available treatment.

15. The following recommendation was not susceptible to joint agreement by the conferees:

Re: Houston Lighting and Power Cedar Bayou Power Plant

(a) The Texas conferee's recommendation-- the once through cooling system, with discharge to Trinity Bay, proposed for the Cedar Bayou plant shall be carefully monitored to determine whether damage to aquatic life is occurring and/or water quality is being deleteriously affected. If such effects are shown, Houston Lighting and Power Company will take immediate steps to correct the situation.

(b) The Federal conferee's recommendation--no discharge of cooling water from the Cedar Bayou plant to Trinity Bay shall be permitted. The Houston Lighting and Power Company shall be required to abate the waste heat load by incorporation of a system utilizing recirculation and reuse of cooling water to Tabbs Bay and adjacent waters or location of additional units at suitable alternative sites.

III

SHELLFISH RECOMMENDATIONS

1. Recommendations

The Food and Drug Administration, in cooperation with appropriate State regulatory agencies, will continue its recently initiated national study of oil and hydrocarbon residues in oysters, including those taken from Galveston Bay, with the objective of determining toxicological effects, if any, of such concentrations. These data, and any evaluations, will be made available to the Conferees of the Galveston Bay Enforcement Conference.

To insure that approved shellfish harvesting areas are properly classified at all times, sampling for determining bacteriological acceptability of areas for shellfish harvesting in Galveston Bay shall continue to emphasize the most unfavorable hydrographic and pollution conditions. The most unfavorable hydrographic and pollution conditions will be determined by technical personnel of the Texas State Health Department, in cooperation with the Food and Drug Administration and other Federal and State and local agencies.

If alert levels for acute and chronically toxic or growth inhibiting factors are developed by the Food and Drug Administration for shellfish from all approved national growing waters, including Galveston Bay, the appropriate Texas agencies and the Environmental Protection Agency, in cooperation with the Food and Drug Administration and other appropriate Federal agencies will work to develop requirements for the same characteristics in waters approved for shellfish harvesting.

2. Discussion

During the summer of 1971, the Food and Drug Administration initiated a nationwide survey of oil and hydrocarbon residues in oysters to determine possible toxicological significance of these concentrations. The Texas State Department of Health has collected oyster meat samples from Galveston Bay for analysis by the FDA laboratory in Dallas, Texas. Plans are underway to establish two permanent sampling stations in Galveston Bay for quarterly analysis of oil and hydrocarbon residues. Preliminary results of the initial sampling have not yet been made available by the FDA for general distribution. The study is continuing.

After reviewing available historical sampling data, the FDA, in cooperation with the Texas State Department of Health has placed increased emphasis on regulating shellfish and water sampling under the most unfavorable hydrographic and pollution conditions to insure that shellfish harvesting areas are properly classified from a bacteriological standpoint. The sample collection schedule has been adjusted to more clearly reflect these conditions. To carry out these new procedures, additional personnel have been hired.

At the Seventh National Shellfish Sanitation Workshop conducted by FDA in Washington, D. C., on October 20-22, 1971, the consensus of opinion was, that while there is a need for some form of alert levels for heavy metals, it would not be practical to publish any official numerical levels for metals in shellfish at this time. The proposed levels which were rejected are shown in Table III-1.

The National Shellfish Sanitation Program acting upon the decision of the Workshop to establish a permanent Chemistry Task Force, has

CHEMISTRY TASK FORCE

TABLE III-1

1. Proposed Alert Levels be Established for the Following Metals in the Species and Areas Indicated:

Metal	Species	Area	Interim Alert Level*
Cadmium	Oyster	Northeast	3.5 ppm
Cadmium	Oyster	Southern	1.5 ppm
Cadmium	Hard Clam	Northern & Southern	0.5 ppm
Cadmium	Soft Clam	Northern & Southern	0.5 ppm
Lead	Oyster	Northern & Southern	2.0 ppm
Lead	Hard Clam	" "	4.0 ppm
Lead	Soft Clam	" "	5.0 ppm
Chromium	Oysters	" "	2.0 ppm
Chromium	Hard Clam	" "	1.0 ppm
Chromium	Soft Clam	" "	5.0 ppm
Zinc	Oysters	Northeast	2,000 ppm
Zinc	Oysters	Southern	1,000 ppm
Zinc	Hard Clam	Northern & Southern	65 ppm
Zinc	Soft Clam	" "	30 ppm
Zinc	Surf Clam	" "	20 ppm
Copper	Oysters	Northeast	175 ppm
Copper	Oysters	Southern	42 ppm
Copper	Hard Clam	Northern & Southern	10 ppm
Copper	Soft Clam	" "	25 ppm
Copper	Surf Clam	" "	5 ppm
Mercury	Oysters	" "	0.2 ppm
Mercury	Hard Clam	" "	0.2 ppm
Mercury	Soft Clams	" "	0.2 ppm

* Drained Wet Meats

Workshop Action

After much discussion on the proposal, the consensus of opinion was that while there is a need for some form of levels for heavy metals, it would not be practical from an industrial viewpoint, to publish any official numerical levels for metals in shellfish at this time. (This statement is taken verbatim from the FDA Synopsis of Workshop - Seventh National Shellfish Sanitation Workshop.)

appointed a tentative committee consisting of members of FDA, EPA, Virginia Institute of Marine Sciences, the States, the industry and the academic community. This group will have authority to set such alert levels for heavy metals, pesticides, oil and hydrocarbons, etc., as additional data and information collected indicate.

IV

A. DISINFECTION OF WASTE SOURCES

1. Recommendation

Effective disinfection of all waste sources contributing bacteriological pollution to the Galveston Bay system will be provided. The Texas Water Quality Board policy to this effect shall continue to be implemented. Where effective disinfection is not presently being accomplished, it is recognized that adequate measures are underway to secure that disinfection. These measures shall be in effect by December 31, 1971.

2. Discussion

A review of the chlorine residual data obtained from the Texas Water Quality Board self-reporting system showed most plants to be in compliance with the disinfection criterion of 1.0 ppm chlorine residual after a 20-minute contact time. Those plants not meeting this criterion were sent a letter requiring compliance by December 31, 1971. In addition, total and fecal coliform results were not satisfactory at some sources where the chlorine residual criterion is being met. See Table IV-1. If a facility was unable to meet the December deadline due to inoperative or inadequate equipment, the Texas Water Quality Board was to be notified by letter of the reason for not complying, the corrective procedures proposed, and the time schedule for placing disinfection facilities into operation.

Because major construction was required, some plants were unable to meet the December 31 deadline. One large plant operated by the City of

TABLE IV-1

MUNICIPAL WASTE DISCHARGES INTO HOUSTON SHIP CHANNEL AND GALVESTON BAY

SOURCE	FLOW MGD	CONTACT TIME MIN	CHLORINE RESIDUAL MG/L	COLIFORM (MPN)		REMARKS
				TOTAL	FECAL	
Alvin, City of	1.9	15.7	1.1	28,000	$\leq$2,400	Two baffles
Bacliff MUD	0.25	25.8	1.3	460,000	460,000	No baffles
Baytown - West Main	0.864	44	3.0+	11,000	2,400	Air mixing
Baytown - Bayway	0.612	65	0.4	460,000	460,000	Clarifier
Baytown - East District	1.1	22.8	1.3	11,000	11,000	Air mixing
Bellaire, City of	2.3	13.2	3.0+	95	15	26 baffles
Cleveland, City of	0.2	67.6	0.0	460,000	460,000	Out of order
Conroe, City of	1.9	19.3	0.9	460,000	460,000	One baffle
Dayton - Northeast Plant	0.2	52.1	3.0+	$\leq$23	$\leq$23	Air mixing
Dayton - Southeast Plant	0.24	37.4	2.8	1,100	460	Three baffles
Friendswood - Plant No. 1	0.2	10.8	1.3	1,100	1,100	Two baffles
Galveston - Airport	0.9	29.8	1.5	23	4	Two baffles
Galveston - Main Plant	8.5	15.6	1.2	$\geq$2.4 x 10^6	$\geq$2.4 x 10^6	Two baffles
Galveston - Teichman	0.033	100	1.2	23	23	One baffle
Galveston Co. WCID #1	0.5	41.7	3.0+	750	750	Clarifier
Galveston Co. WCID #12	0.23	8.4	0	46 x 10^6	24 x 10^6	Out of order
Harris Co. WCID #55	0.95	30.6	1.2	24,000	24,000	Four baffles
Houston, City of						
Northside	65	7.5	0	110 x 10^6	46 x 10^6	
Sims Bayou	37	0	0	2.4 x 10^6	2.4 x 10^6	No facilities
Chocolate Bayou	1.5	0	0	11 x 10^6	11 x 10^6	No chamber
Clinton Park Plant	0.38	37.4	2.3	1,100	460	No baffles
FWSD #23	1.1	28.3	1.5	11,000	4,000	Three baffles
West District	9.0	15.9	1.0	640,000	640,000	One baffle
Southwest	24.0	30.7	0.9	90	90	
WCID #47	1.6	57.4	2.4	0	0	One baffle
WCID #51	1.5	20.6	3.0	240,000	240,000	Three baffles
Northwest	4.5	26.0	1.0	460,000	150,000	Three baffles

TABLE IV-1 (Cont'd)

SOURCE	FLOW MGD	CONTACT TIME MIN	CHLORINE RESIDUAL MG/L	COLIFORM (MPN) TOTAL	COLIFORM (MPN) FECAL	REMARKS
La Marque, City of	1.5	10.3	1.7	225,000	150,000	One baffle
League City						
Main Plant	0.6	17.8	3.0+	93	93	
Glen Cove	0.105	27.6	2.8	9	4	No baffles
Liberty - Main	0.35	36.2	1.4	110,000	110,000	One baffle
- Treetop	0.022	unknown	0	11 x 10^6	11 x 10^6	Out of order
Mount Belview	0.079	36.2	0.6	≥240,000	46,000	Four baffles
Montgomery Co.						
FWSD #2	0.1	672	0	240,000	240,000	Four baffles
New Caney ISD	0.024	82	0	93,000	93,000	One baffle
- Porter Elementary	0.014	563	0	11 x 10^6	4.6 x 10^6	Clarifier
Pasadena						
Northside West 1A	1.98	242	0.5	150	150	Clarifier
Deepwater	1.8	393	1.6	1,500	1,500	Clarifier + contact chamber
Plant #3	1.4	0	2.0	460,000	460,000	2 mile 36-in. line past sample point
Northside East 1B	1.98	108	2.1	240	240	Clarifier
Saconas, George	0.03	6.2	0.1	460,000	240,000	No baffles
South Houston	0.15	814	0.0	46 x 10^6	46 x 10^6	One baffle
Stuckey, Doyle	0.023	4.5	0.5	2.4 x 10^6	2.4 x 10^6	One baffle
Texas City - Main Plant	2.6	65	3.0+	150	43	Ten baffles
- Plant #2	0.8	22.6	2.8	15	9	13 baffles
West University	1.08	62	3.0+	23	23	Six baffles

Houston, Sims Bayou, was known to have no chlorination facilities. The Texas Water Quality Board, in participating in the development of the Conference recommendations, agreed that all plants would have adequate disinfection equipment in operation by December 31, 1971, with the exception of the City of Houston Sims Bayou plant.

The schedule for completing the new facility at the Sims Bayou plant along with improvements at other Houston plants, is given in Board Order 71-0819-1 and the addendum to that Order. Refer to Attachment No. 1

Grab samples were collected and analyzed by Texas Water Quality Board personnel at 50 major municipal plants in the Conference area. This study was conducted to determine the reliability of existing chlorination facilities and the effect of chlorination on the municipal effluents. The survey took place from March 27 through March 29, 1972. Only those plants discharging directly into Galveston Bay or into the Bay's tributaries were sampled. Sampling and testing were done in accordance with Standard Methods. The chlorine residual was measured by the orthotolidine method utilizing the Hach Chlorine Test Kit. Four samples were lost during transportation or analysis.

The results of the survey are as follows:

1. Forty-nine of the fifty plants sampled have chlorination facilities.
2. One chlorinator was out of order.
3. The chlorination facility at the Sims Bayou plant, City of Houston, is under construction and will be in operation by December 31, 1972.

4. The Texas Water Quality Board will continue to enforce regulations for effective disinfection and where disinfection is found to be ineffective, the problem will be pursued until it is adequate. In support of the program, the City of Houston Health Department will expand its bacteriological surveillance of waters within its territorial jurisdiction. These data will be forwarded to the Texas Water Quality Board and the City of Houston sewer department for appropriate action.

B. CENTRALIZATION OF TREATMENT FACILITIES

1. Recommendation

The Texas Water Quality Board will continue to implement its policy requiring the elimination of small plants. The centralization of facilities, wherever possible, and the halt of proliferation of small plants will continue, consistent with existing appropriate procedures. The implementation schedule for this program, as initiated by the Texas Water Quality Board, will be made available to the Conferees of the Galveston Bay Enforcement Conference not later than April 1, 1972.

2. Discussion

This policy calls for the development of regional systems and the abandonment of outdated facilities where and whenever practical. Applications for new plants have been denied when the possibility of a tie-in to an existing system exists. This will continue to be a State-wide policy of the Texas Water Quality Board.

In accordance with this approach, Board Order 71-0819-1 (Attachment 1) requires the City of Houston to abandon a number of obsolete plants and to divert these wastes to regional and subregional plants. The implementation dates for these diversions are included in Attachment 1). Completion dates will fall before December 31, 1974. Firm commitments for the abandonment of obsolete or unnecessary plants and for the development of regional plants have been established as a result of the Clear Lake Board Order, 69-9A. (Attachment 2)

Attachment No. 3 is a tabulation of sewage plants affected by the proposed Houston-Galveston area regional plan. This plan was prepared for the Houston-Galveston Area Council as a long range concept to be modified as population growth dictates. The tabulation includes those plants whose roles in regionalization are firmly established by Board Order Nos. 69-9A and 71-0819-1.

V

GALVESTON BAY WASTE SOURCE SURVEY

1. Recommendation

The EPA and the Texas Water Quality Board will cooperate in a study of Galveston Bay. This study is presently being conducted by the Texas Water Quality Board on all sources of municipal and industrial wastes permitted by the Texas Water Quality Board to discharge effluent to Galveston Bay and its tributaries. These examinations shall emphasize determination of complex organic compounds, heavy metals and other potentially toxic substances, as well as oil and grease, from each waste source. Recommendations and scheduling of necessary abatement will be provided to the Conferees as soon as they become available. The Texas Water Quality Board permits and self-reporting data system will be amended, as necessary, to reflect the recommendations of this waste source survey. A progress report on results of this study will be made to the Conferees within six months of the date of the reconvened session of the Galveston Bay Enforcement Conference.

2. Discussion

The joint EPA-Texas Water Quality Board waste source survey commenced on April 17, 1972. The purpose of the survey is to develop information on waste constituents other than biochemical oxygen demand such that an allocation of the constituents among individual waste dischargers consistent with best available treatment practices as detailed in Recommendation 13. It is presently estimated that approximately one-half the effluent waste flow to the Houston Ship Channel will have been sampled and analyzed by **October** 1972. Results of these evaluations will be provided to the Conferees as soon as they become available.

VI

OIL AND GREASE REMOVAL

1. Recommendation

The Texas Water Quality Board will continue its review of each waste source discharging to Galveston Bay and its tributaries, and will amend those permits as necessary to insure that the best reasonable available treatment is provided relative to discharges of oil and grease. The Texas Water Quality Board will cooperate with EPA and local governments in determining what treatment is the best reasonable available treatment. It is recognized that improvements in technology will be incorporated into future permit revisions. A progress report will be made to the Conferees within six months of the date of the reconvened session of the Galveston Bay Enforcement Conference.

2. Discussion

The most effective process for the removal of oil and grease from an aqueous waste is gravity separation followed by biological treatment. Efficiencies of removal greater than 99 percent can be expected. Removal by gravity separation alone is much less effective.

Based upon a review of the literature, the best reasonable available treatment for continuous flows of oily waste is gravity separation followed by aerobic biological treatment. This procedure will normally produce an effluent containing less than 10 mg/l of oil and grease as measured by the Soxhlet extraction method.

The traditional method of treatment of oil and grease wastewaters from industrial, business, and domestic sources has been gravity separation. This process gained popularity for a number of reasons, among which are recovery of valuable product or resource, ease of maintenance, and low capital and operating costs. However, the efficiency of the process is limited by the settling velocity of the oil globules and the degree of emulsification. Although the standard API separator is designed for 15 micron diameter globules, the literature indicates this design will remove only 84 percent of 120 to 150 micron diameter globules and considerably poorer performance is attained on oil particles smaller than this.

An improvement on the basic gravity separator which has proven effective is the installation of parallel plate baffles set at a 45° angle to the vertical. These may be upflow or downflow baffles or a combination of both. The principle involved which improves performance is reduction of the required settling distance of the globules. Experimental results on this type unit have demonstrated removal of all globules larger than 90 microns, 93 percent of 60 to 90 microns and 80 percent of 30 to 60 microns.

Another process which has proven effective in a number of industrial applications is that of dissolved air floatation. This is fundamentally a secondary treatment process and should be preceded by a gravity separation unit to remove the easily separable solids. The process utilizes the formation of very small air bubbles caused by rapid decompression of the water and dissolution of the dissolved gases in the water. This process may involve drawing a vacuum on water saturated with air at atmospheric pressure or, the method commonly used, saturation of the water with air at several atmospheres pressure with bubble formation occurring on release to atmospheric pressure. Bubble formation occurs on particulate surfaces and additional suspended matter may be adsorbed on the air-water interface as the bubble rises to the surface. Coagulants may be introduced to the waste stream prior to air floatation to enhance the efficiency of the process. Reported effluent levels for dissolved air floatation plus chemical aids for coagulation are in the range of 5 to 25 mg/l while those for the floatation process alone are 25 to 100 mg/l.

Other candidate physical-chemical processes are chemical coagulation-flocculation, filtration, and heating. Although these processes are generally very effective in oil and grease removal, they are rarely if ever utilized exclusively for this purpose due to the comparatively high capital and operating costs.

Biological treatment of oily wastes has proven to be an effective means of treatment under certain conditions. Typically the concentrated oily waste streams are pretreated by gravity separation and the effluent blended with other waste streams prior to biological treatment.

Although investigators have demonstrated biological decomposition of hydrocarbons by aerobic systems, the primary mechanism of removal in an activated sludge system is believed to be adsorption of the oil onto the biological floc and subsequent removal by sedimentation and excess sludge wasting. However, if the oil loading is excessive, the settling characteristics of the sludge may be impaired, resulting in solids loss out of the sedimentation basin and plant upset. The limiting concentration for activated sludge processes is believed to be between 25 and 50 mg/l.

Trickling filters, while not as susceptible to upset, are also concentration limited and rely on the same basic principles as activated sludge for oil removal. The limiting concentration is that which is sufficient to coat the biological slime on the filter media thereby blocking oxygen transfer and substrate removal.

The magnitude of the oil and grease waste problem in Texas is indicated by a survey taken by the Texas Water Quality Board in 1971 on the industries located on the Houston Ship Channel and in the Baytown area. "Grab" or individual samples were taken from 18 industries comprising approximately 70 percent of the total oil and grease discharges authorized by the Texas Water Quality Board. The total computed daily oil and grease discharge for these 18 industries was 20,200 pounds; extrapolated for the

43

remainder of the authorized discharges, an estimate of 28,800 pounds per day was derived. The average concentration of the discharges varied between 16 and 25 ppm oil and grease.

The effects of oil and grease on estuarine systems has been the subject of a great deal of controversy and investigation in recent years. The issues were brought into focus by the wreck of the "Torrey Canyon" off the coast of England and more recently by the spill off the coast of California at Santa Barbara. Both of these incidents occurred near heavily populated beaches and resulted in bird and fish kills.

Studies of oily wastes discharges on receiving streams have indicated that a definite sequence of events follow introduction of oil emulsions into the stream. Oil globules from the emulsions were trapped in the biological material which agglomerated into a settleable floc and carried the oil down with it. The settled solids quickly became anaerobic after deposition during warm weather. The net result was a fairly rapid physical separation of the emulsified oil from the flowing water. Most of the oil was stored in sludge banks during low flow conditions.

It has been determined that mineral oil emulsions will degrade aerobically, at typical summer temperatures with 50 to 80 percent reduction per week. However, laboratory studies indicate little, if any, decomposition under anaerobic conditions.

In summary, it appears that gravity separation followed by biological treatment equivalent to activated sludge affords the best treatment for oily wastes with the least capital investment if a biological plant is required for other waste streams and the oil concentrations can be kept to acceptable levels for the biological system. Systems of this type have been demonstrated to be 99+ percent effective in oil and grease removal.

Although effluent levels of below 5 ppm oil and grease have been reported with biological systems, the treatment efficiency fluctuations of biological systems with varying climate conditions and hydraulic loadings and the accuracy of the Soxhlet extraction method would indicate that 10 ppm may be a more reasonable goal. It is recommended that abatement facilities for process wastes containing oil and grease be installed and maintained such that the effluent will contain the minimum amount of oil and grease but in no case to exceed 10 ppm.

All new waste control orders for process discharges issued for industries discharging into the Houston Ship Channel will reflect this oil and grease policy. Existing waste control orders for process discharges will be amended to the new level when they are reviewed as the result of information obtained during the intensive waste source survey.

VII.

WASTE LOAD REDUCTION PROGRAM

1. Recommendation

The ongoing review and amendment by the Texas Water Quality Board of existing permits recognizes that greater reductions of waste will be required of waste dischargers to the Galveston Bay system to meet water quality standards. The Conferees note that in the past three years the organic waste load being discharged into the Houston Ship Channel has been lowered from about 430,000 pounds per day of BOD to 103,000 pounds per day of BOD. Any amendments to existing or new Texas Water Quality Board waste control orders as a result of this program will prohibit dilution as a substitute for treatment. A progress report on continuing reduction of

HOUSTON SHIP CHANNEL
B.O.D. LOADING

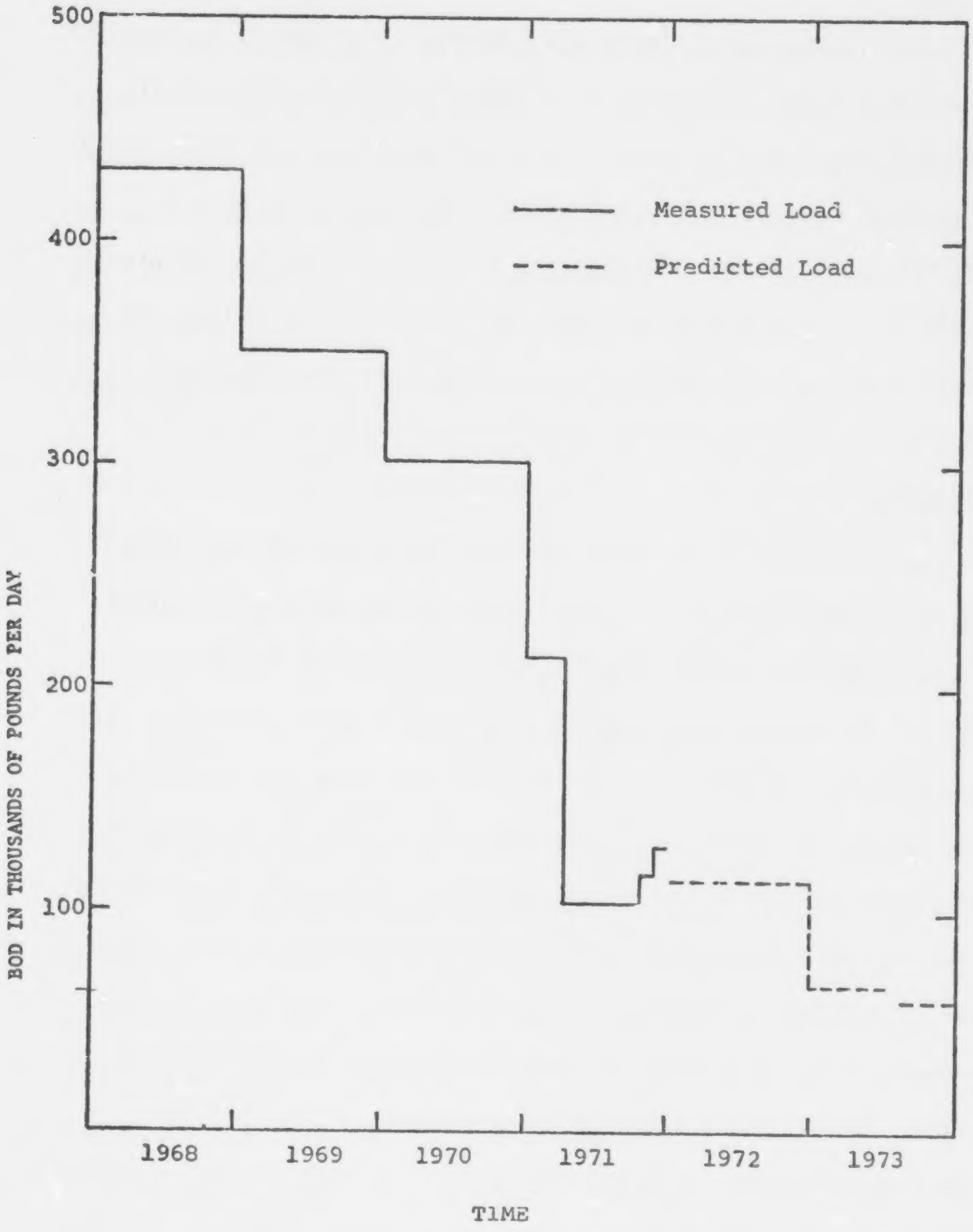

FIGURE VII-1

waste loads will be provided to the Conferees within six months of the date of the reconvened session of the Galveston Bay Enforcement Conference.

All waste sources which discharge directly to Galveston Bay and other tributary areas, including Clear Lake, shall have allowable waste loads allocated by June 30, 1972, consistent with best available treatment practices. This allocation shall include interim dates for accomplishment of required waste treatment and/or waste treatment facilities which will be in operation by December 31, 1974. The Texas Water Quality Board will cooperate with EPA and local governments in determining what treatment is the best reasonable available treatment.

2. Discussion

The major sources of pollution entering Galveston Bay are those industries and municipalities located along the Houston Ship Channel and in the Texas City area. Significant reductions of wastes discharging to the Houston Ship Channel have been accomplished since 1968.

Approximately 430,000 pounds of B.O.D. were being discharged daily into the Channel in 1968. This load had been reduced to approximately 100,000 pounds per day by the summer of 1971. Figure VII-1 represents the reduction of waste discharges to the Houston Ship Channel with respect to time. The figure indicates a slight increase in the load for November and December 1971, reflecting seasonal fluctuations as reflected by the Texas Water Quality Board self-reporting system.

A further reduction of approximately 6,000 pounds per day is expected with the projected completion of a communal treatment facility for five industries on the Channel. This planned facility will treat effluent

TOTAL B.O.D. CONTRIBUTED BY THE FOUR MAJOR
TEXAS CITY INDUSTRIES

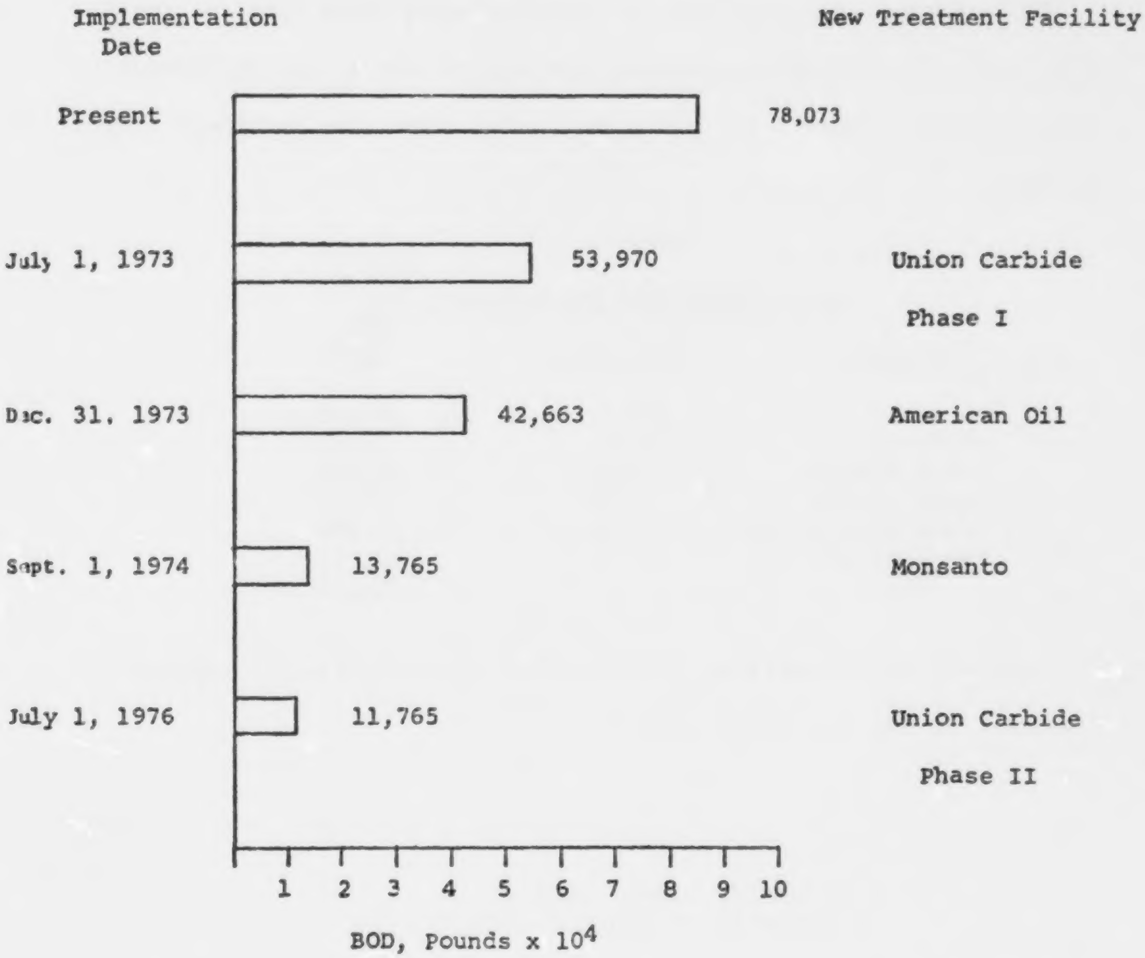

FIGURE VII-2

from Atlantic Richfield Company, Crown Central Petroleum Company, Petro Tex, Goodyear and U. S. Plywood - Champion Paper Company.

If all planned abatement facilities remain on schedule, B.O.D. discharges to the Houston Ship Channel will be reduced to approximately 60,000 pounds per day by December 1973.

Less progress has been made in reducing waste loads from the Texas City area. Four industries account for most of the B.O.D. discharged from the area. Table 1 lists the four major industries and their present discharge.

Table 1

Major Texas City Dischargers

Discharger	Flow (MGD)	BOD_5 (ppd)
Monsanto	56.0	24,428
Monsanto	19.5	2,487
Union Carbide	9.02	31,144
Union Carbide	0.90	5,817
Texas City Refinery	1.34	290
American Oil	15.44	13,907
TOTAL		78,073

Figure VII-2 illustrates the scheduled implementation of improved treatment at the four major plants.

VIII

ORGANIC SLUDGE DEPOSITS
DISPOSAL OF DREDGING SPOIL

1. Recommendation

A characterization and evaluation of the water quality significance of materials from pollution sources contained in the organic sludge dredged from the Houston Ship Channel shall be conducted. Based on the results of this evaluation and examination of present spoil disposal areas, recommendations will be made by the Texas Water Quality Board and the Environmental Protection Agency on location of suitable spoil disposal areas and other appropriate action to minimize or eliminate deleterious effects on water quality.

2. Discussion

This report summarizes the analytical findings presented in Technical Report #8 - Estuarine Systems Project, Environmental Engineering Division, Texas A&M University. The study was funded by the following State and Federal agencies: Federal Water Pollution Control Administration, National Science Foundation, Texas Engineering Experiment Station, and Texas A&M University.

During the Spring of 1970, Texas A&M University conducted extensive field investigations of the quantity and quality of the benthal deposits contained in the Houston Ship Channel and its tributary bays. Analyses conducted on the sludge samples include volatile solids, BOD_5, COD, oil and grease. Samples were obtained from stations located along the entire channel length and from various points within the channel cross section. Core samples were also taken in three of the side bays.

Main Channel

Table VIII-1 gives a physical description of the sludge core samples taken at stations along the channel. The physical characteristics vary considerably. An interest trend is the increase in deposit thickness and the visible oil content above mile point 14.

Figure VIII-1 is a volatile solids profile of the deposits. The scattering of the data points at each station indicates the variation in volatile

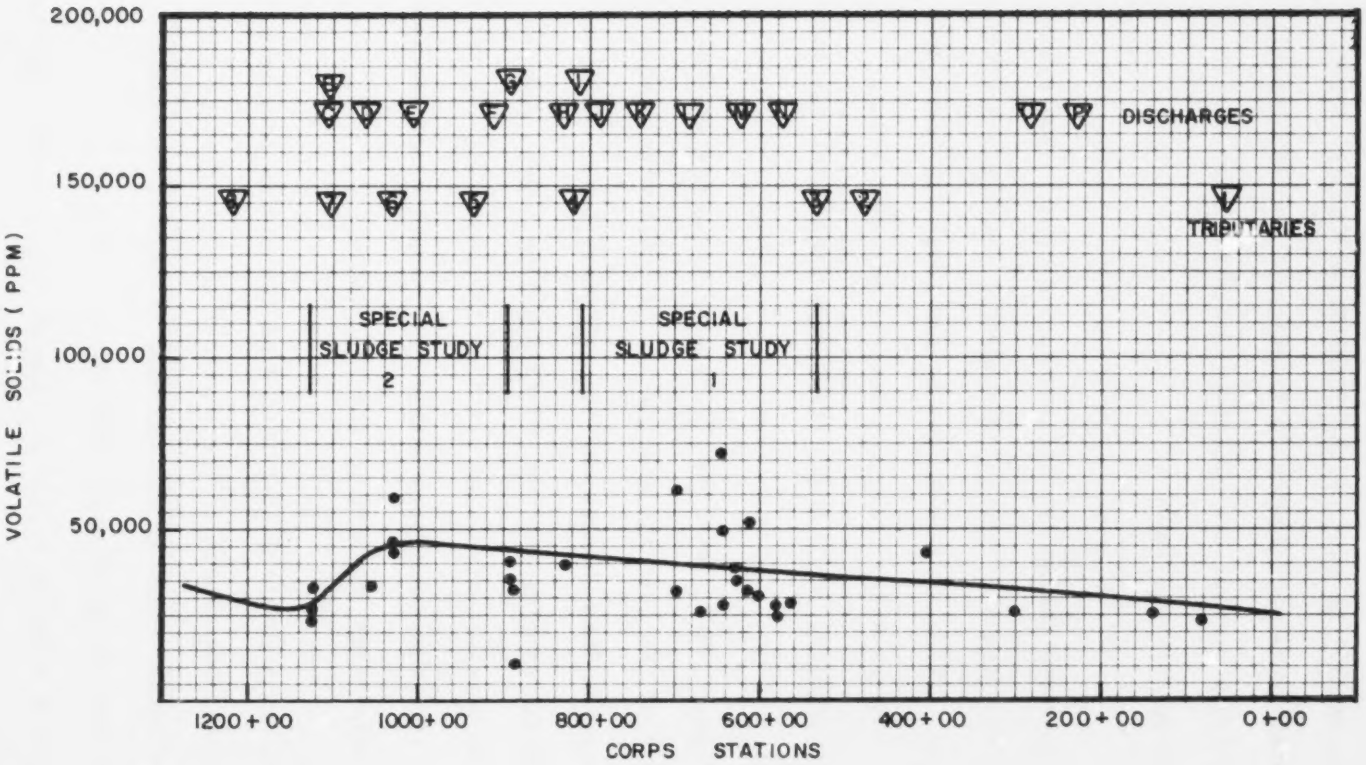

FIGURE VIII-1

VOLATILE SOLIDS PROFILE OF BOTTOM SLUDGES

TABLE VIII-1 Observations*

Sample Location (mile)	Depth of Sludge Core Collected in Sampler (ft.)	Description of Sludge and Underlying Material
0	3.5	Grayish Sludge Material on Red Clay Bottom
2	4.5	Black Sludge, No Underlying Material Picked Up by Sampler
4	1.6	Black Sludge on Gray Clay Bottom
6	No Sludge	Gray and Red Clay
8	1.5	Black Sludge on Gravel and Clay Bottom
10	.5	Dark Gray Sludge and Clay Material
12	2.5	Black Sludge on Clay Bottom
14	3.5	Black Sludge on Bed of Red Clay
16	3.0	Black, Oily Sludge on Bottom of Red Clay
18	3.5	Black Sludge on Red Clay Bottom
20	2.0	Black, Oily Sludge on Red Clay Bottom
22	3.0	Black Sludge on Red Clay Bottom
24	3.0	Black Sludge on Red Clay

solids content within a given cross section. The quality variation within a cross section is verified by analyses of the other parameters. Figure VIII-2 is a longitudinal profile of the percent volatile solids contained in the sludge. This is a steady increase in the percent volatile solids from Morgan's Point, mile point 0 (8%), to the Turning Basin, mile point 24 (11%).

Profiles of BOD_5 and COD, Figures VIII-3 & VIII-4 indicate a significant variation in the COD and to a lesser extent the BOD_5 of the benthal deposits. The COD of the sludge more than doubles above mile point 12. This finding should be expected because of the heavy concentration of municipal and industrial discharges above this point. The BOD_5 data shows a similar trend.

A very significant finding is the increase in BOD_5 values with increased dilution of the samples. Several dilutions were made for each BOD analysis. As the percent of the sample in the BOD bottle decreased, i.e., an increase in dilution, the oxygen uptake increased. Not all of the samples displayed this phenomenon; however, enough did to make the finding significant. In some analyses, diluting the sample to one-fourth its initial concentration more than doubled the calculated BOD. The implication is that some of the benthal deposits contain toxic materials that reduce biological activity.

Figure VIII-5 shows a steady increase in the percent of oil and grease from Morgan's Point to the Turning Basin. The average oil and grease content of the sludges appears to be approximately 0.5 percent.

Side Bay Delta

Core samples were taken of the deposits in three side bays tributary to the Ship Channel. Scott, Burnett, and Upper San Jacinto bays

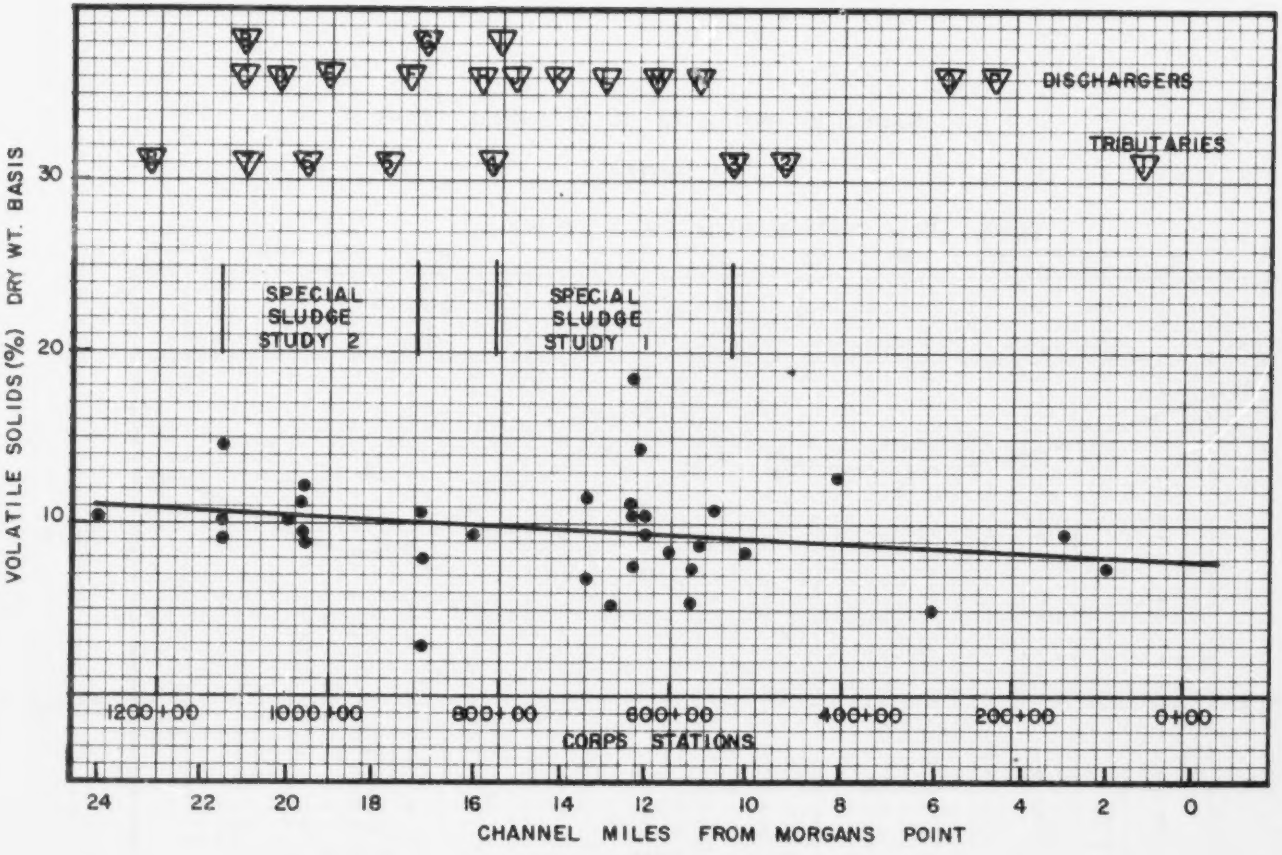

FIGURE VIII-2

VOLATILE SOLIDS (%) PROFILE OF BOTTOM SLUDGES

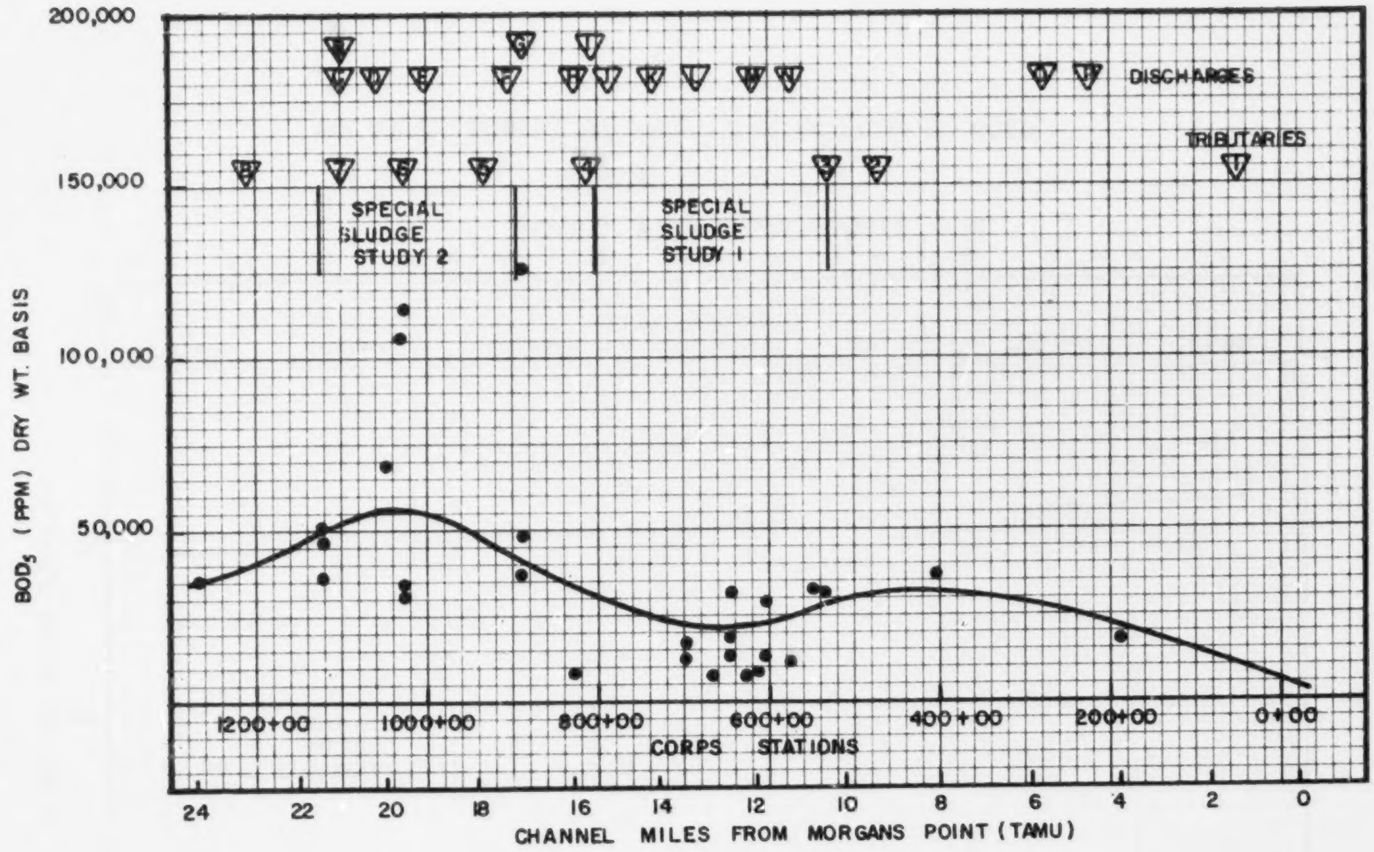

FIGURE VIII-3

BOD$_5$ PROFILE OF BOTTOM SLUDGES

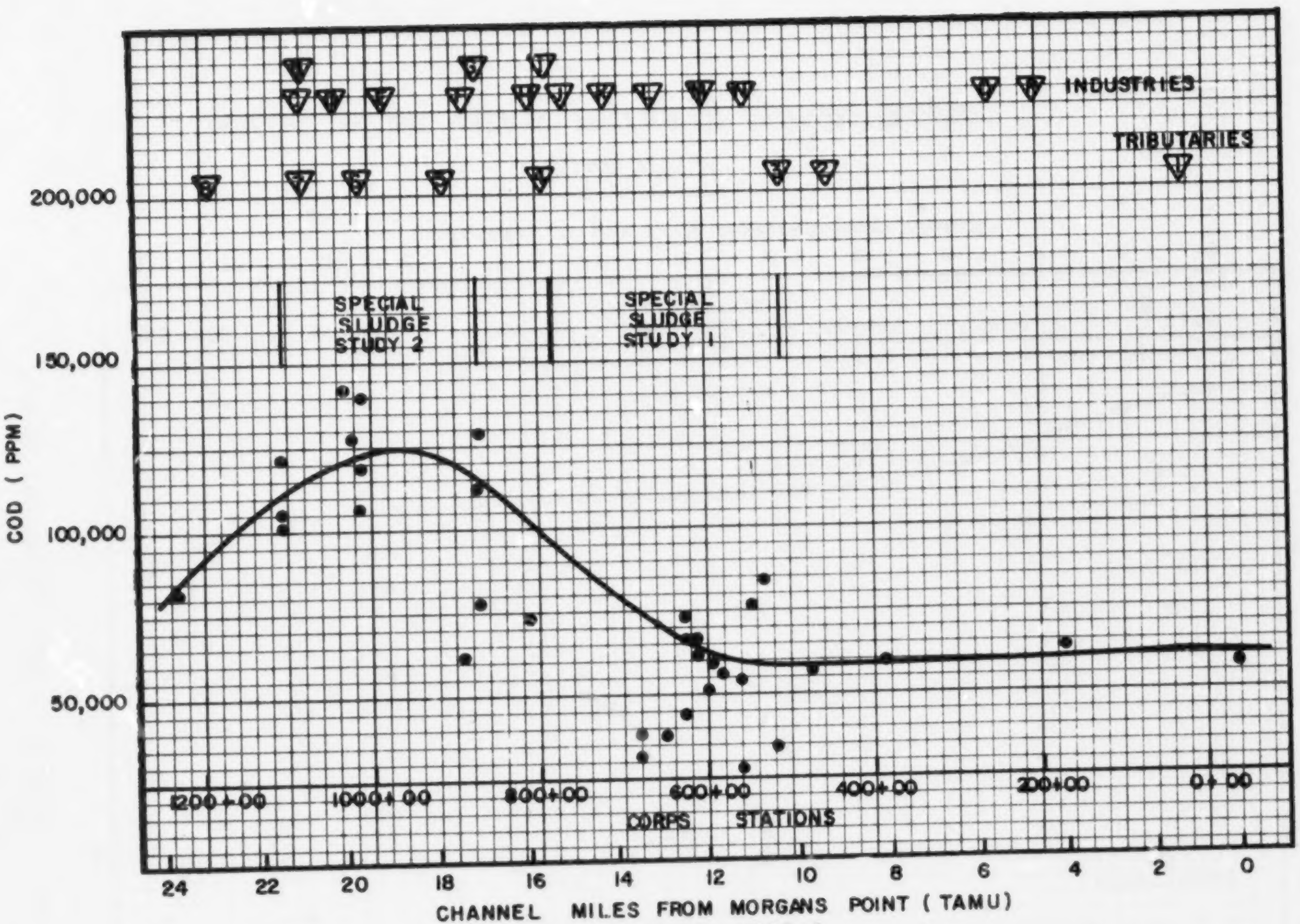

FIGURE VIII-4
COD PROFILE OF BOTTOM SLUDGES

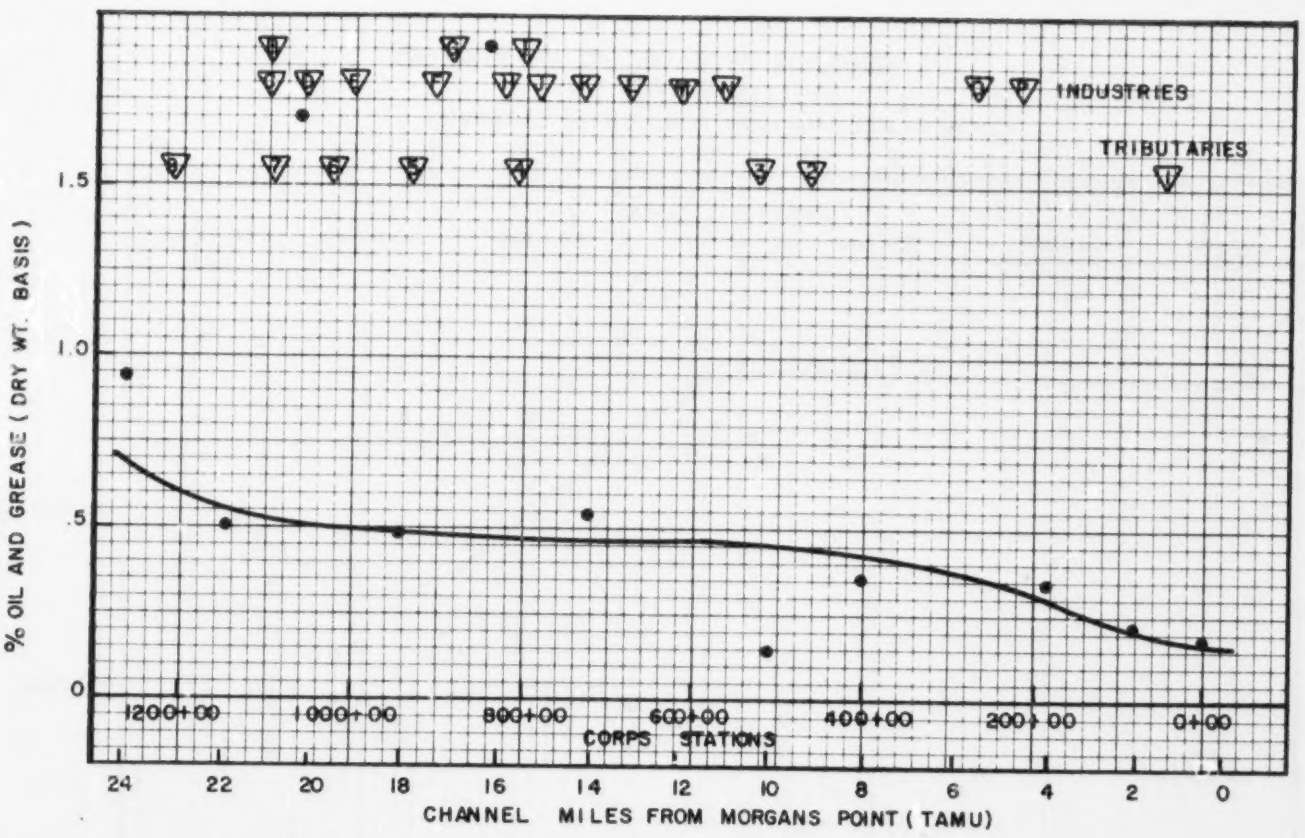

FIGURE VIII-5

PERCENT OIL AND GREASE PROFILE OF BOTTOM SLUDGES were sampled to determine the effect of sludge deposits on the quality of the waters in the bays. Table 2 lists the BOD_5, COD and volatile solids for a composite sample of the sediments in each bay. Physical descriptions of the core samples are included in the tabulation. Only the sample taken from Scott Bay demonstrates a significant BOD_5. The ratios between BOD_5, COD and volatile solids values found in Scott Bay to those found at adjacent sampling stations in the Ship Channel are 1:3, 1:2 and 1:2 respectively. The presence of significant levels of pollutants in the Scott Bay deposits may be due to the location of Enjay Chemical Company's waste outfall in the bay.

Conclusions

1. The benthal deposits contained in the Houston Ship Channel and its tributary bays represent an important pollutional source.

The deposits located above mile point 12 are of considerably worse quality than those below or of those in the side bays. However, the effect of the side bay sludges on the water quality of those shallow waters may be very important.

2. The BOD analyses indicate the Channel deposits contain materials toxic or inhibitory to microorganisms.

Recommendations

Spoil sites should be located where the dredged material is permanently removed from the Channel and its tributaries. These sites should be adequately diked and protected to prevent runoff from the areas.

Representatives of the U. S. Corps of Engineers and the EPA have proposed the construction of a diked spoil area on Atkinson Island. As proposed, spoil material will be deposited within the diked area until the final elevation of the island reaches 12 feet above MSL. The

TABLE VIII-2 - Side Bay Analytical Data Summary*

Sample	(ppm) BOD_5	(ppm) COD	(ppm) Volatile Solids	Volatile Fraction %	Description
			Upper San Jacinto Bay		
C	1,560	25,700	25,150	5.7	2'-0" Grey - Black Material on Clay Bottom
B	-	-	-	-	2'-2" Grey - Black Material on Clay Bottom
A	-	-	-	-	2'-0" Grey Sandy Sludge on Sand Bottom
			Burnett Bay		
C	1,710	23,080	24,030	6.0	5'-3" Black Anaerobic Material, Lighter Color at Bottom
B	-	-	-	-	3'-5" Black at Top, Grey Near Bottom
A	-	-	-	-	4'-2" Anaerobic Material Black at Top Grey Near Bottom
			Scott Bay		
C	6,240	37,300	29,000	7.3	4'-6" Black at Top, Grey Near Bottom
B		-	-	-	5'-0" Black at Top, Grey Near Bottom
A		-	-	-	4'-5" Black to Grey With Sand

ultimate use of the spoil islands has not been decided, but recreation and wildlife refuge have been mentioned as possible uses. The EPA representative suggested the Texas Water Quality Board and EPA conduct a joint productivity study of the area to determine the environmental impact of the project.

IX

COLOR REMOVAL

1. Recommendation

Chemical constituents causing color in waste effluents, such as those from pulp and paper mills, shall be reduced to natural background in area waters as soon as practicable as stated in existing Texas Water Quality Board waste control orders. A report on feasible processes to accomplish this recommendation shall be submitted to the Conferees within six months of the reconvened session of the Galveston Bay Enforcement Conference.

2. Discussion

Major contributors of colored waste include paper mills, tanneries, textile mills, dye manufacturers and electroplating shops (R-8). Of these, only paper mills are known significant contributors in the geographical area of interest. The brown color in paper mill effluent is related to the lignin in the effluent, and lignin resists biological attack. Only a small part of the BOD of lignin is determined in a five-day test, but a significant long term BOD is reported (R-1)(R-11). For this reason, color in paper mill effluents may be an indicator of oxygen demand, whereas in most cases it is not.

Current Operation

Values of current effluent quality for municipal plant discharges are usually not reported in the literature, but two sources cite colors of 30 and 75 color units (R-10)(R-4). Activated sludge plants can remove more than 90 percent of the influent color but trickling filters are less efficient and primary treatment alone is much less efficient (R-9).

File data on chemical plants records one petrochemical plant effluent as high as 150 color units (R-15). The State of California considers 150 color units as the maximum value for a "good source of domestic water supply (R-5). Since (1) the data available on color in municipal and industrial effluents is sparse, and (2) the data collected reveals relatively low color values, one can conclude that color is usually not a problem where wastewater is subjected to good secondary treatment.

By contrast, current effluent quality for paper mills is in the range of 500-1,000 color units (APHA, Pt-Co), while typical raw blended kraft effluent itself averages about 2,000 (R-16) (R-14) (R-6). Several processes are used to make paper, and the type of process has a significant bearing on the type of waste discharged (R-17). A limited amount of test data on paper plant effluents in the Houston Ship Channel area gives values ranging from 100 to 1080 color units (R-15). Activated sludge secondary treatment units normally remove about 10-15 percent of the color in these effluents, and this unit process is frequently used to treat paper mill discharges (R-17). The relative inefficiency of biological processes in terms of color removal accounts for the high color remaining in the effluents.

Best Practice

Treatment of municipal waste with activated carbon can reduce the color from 30 to 3 units, where it is most likely a candidate for reuse (R-10). Ion exchanging can reduce kraft paper mill bleaching waste from

1500 to 200 Pt-Co units (R-12). Pilot plant data on "massive" lime treatment processes indicate that greater than 90 percent of the color can be removed from raw bleached kraft effluent. A color of 200-400 units could be expected. Carbon columns following in series with lime treatment can further reduce color to less than 30 units. Costs for these treatment steps are relatively high (R-16) (R-3) (R-14).

Background Color in Galveston Bay and Tributaries

On April 17, 1972 a survey was conducted to determine the background color of the Houston Ship Channel, Upper Galveston Bay, and the tributary streams within the estuarine system. Surface to bottom composite samples were collected at each site with the analyses being made by the EPA lab in Houston. All sampling and analyzing procedures were performed according to Standard Methods. The attached table includes the location and color value for each sample. (Table IX-1)

Three samples were obtained in the Houston Ship Channel. The first sample was taken at the confluence of Sim's Bayou and the Channel, above the Champion Paper discharge. The next was taken at Green's Bayou below the Champion discharge. The influence of the Champion discharge (160 APHA units) is apparent. The remaining sample taken at the Monument shows the influence of the Southland Paper discharge (180 APHA units). The average color for Ship Channel water was 42 APHA units for this particular day.

The average color content of the waters in the side bays is 72 units, slightly higher than the Channel. This increase is expected due to the relatively large land - water contact area found in the shallow side bays.

TABLE IX-1

BACKGROUND COLOR SURVEY -
UPPER GALVESTON BAY AND TRIBUTARIES

Sample Location or Description	Apparent Color Units (APHA, Pt-Co)
Houston Ship Channel at Sims' Bayou	30
Champion Paper Effluent Plume	160
Houston Ship Channel at Green's Bayou	46
Southland Paper Effluent Plume	180
Houston Ship Channel at Monument	50
San Jacinto River at IH-10	70
Burnett Bay	100
Scott Bay	65
Tabbs Bay	55
Upper Galveston Bay at Barbour's Cut Channel	65
Trinity Bay between Umbrella Point & Smith Point	48
Galveston Bay between Smith Point & Eagle Point	39
Galveston Bay at Ship Channel Marker #65	33
Galveston Bay at Morgan's Point	44
Cedar Bayou at IH-10	47
Green's Bayou at IH-10	60
Buffalo Bayou at N. Main St. Bridge	32
Bray's Bayou at IH-45	42
Hunting Bayou at IH-10	40
Sims' Bayou at State Highway 225	80

Samples taken in Upper Galveston Bay show an average color of 46 units. The average color found in the streams tributary to the Houston Ship Channel was 50 APHA units. The decrease in color of the Channel water from that found in its tributaries is probably due to dilution by the relatively colorless municipal effluents and the underflow of bay water.

Conclusions

The background color in natural waters is a highly variable quality parameter. The color of unpolluted water can vary from clear to almost black. Color is an aesthetic problem; the extent of the problem is determined by the individual observer.

The color from most municipal and industrial effluents is minimal. The color in paper mill effluent is contributed by tannins and lignins which are found in most naturally colored waters. These compounds represent an oxygen demand in the stream; however, the biological reaction rate is so slow that the stream oxygen resource is not appreciably affected.

The very low reaction rate also makes color removal by biological treatment impractical. Physical-chemical methods for removal of color from paper mill wastes are technically possible but are economically prohibitive at this time.

The background color of the tributary waters of the Galveston Bay system is higher than that found in the Ship Channel. This is true even after the discharge of colored effluents from two large paper mills. The difference between the maximum color found in the Ship Channel and that in Upper Galveston Bay is statistically insignificant.

Recommendations

In an estuarine system such as Galveston Bay, the increase in color contributed by waste discharges is small. Requiring extensive color

IX. COLOR REMOVAL
REFERENCES

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(R-5) McKee, J.E. and Wolf, H.W. eds., Water Quality Criteria, The Resources Agency of California, State Water Quality Control Board, Publication No. 3A, 1963.

(R-6) Moggio, W.A., "Color Removal from Kraft Paper Waste", Proceedings of 9th Industrial Waste Conference, Purdue University, May, 1954, p. 465.

(R-7) Murphy, N.F. and Gregory, D.R., "Removal of Color from Sulfate Pulp Wash Liquors), Proceedings of 19th Industrial Waste Conference, Purdue University, May, 1964, p. 59.

(R-8) Nemerow, Nelson L., "Color and Methods for Color Removal", Proceedings of 11th Industrial Waste Conference, Purdue University, May, 1956, p. 584.

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(R-11) Raabe, E.W., "Biochemical Oxygen Demand and Degradation of Lignin in Natural Waters", J. of WPCF, V. 40, No. 5, May, 1968, P. R145.

(R-12) Rohm and Haas Company Technical Brochure, "Decolorization of Kraft Pulp Bleaching Effluents Using Amberlite XAD-8 Polymeric Adsorbent", Rohm and Haas, August, 1971, p. 3.

(R-13) Smallwood, C., Jr. and Fortune, D.L., "The Measurement of Color Pollution in Streams", Proceedings of 14th Industrial Waste Conference, Purdue University, May 1959, p. 509.

(R-14) Smith, Donald R. and Berger, Herbert F., "A Chemical-Physical Wastewater Renovation Process for Kraft Pulp and Paper Wastes", J. of WPCF, V. 40, No. 9, Sept., 1968, p. 1575.

(R-15) Texas Water Quality Board Files

(R-16) Thibodeauz, L.J., Smith, D.R. and Berger, H.F., "Wastewater Renovation Possibilities in the Pulp and Paper Industry", Chemical Engineering Progress Symposium Series 90, V. 64, 1968, p. 178.

(R-17) U.S. Department of the Interior, FWPCA, The Cost of Clean Water, Volume III, Industrial Waste Profiles No. 3 - Paper Mills, U.S. Government Printing Office, Washington, D.C., 1967.

(R-18) Wakeley, J.H. and Nemerow, N.L., "Measurement of Objectionable Stream Colors Resulting from Wastes", Proceedings of 13th Industrial Waste Conference, Purdue University, May, 1958, p. 465.

removal in waste effluents using today's technology, will greatly increase treatment costs while resulting in an insignificant improvement in the Bay. The Texas Water Quality Board will require color reduction when technology becomes feasible as specified by existing waste control orders.

X

BOD ALLOCATIONS TO HOUSTON SHIP CHANNEL

1. Recommendation

To meet present official State-Federal water quality standards established for dissolved oxygen in the Houston Ship Channel, it is expected that the maximum waste load discharged from all sources will be about 35,000 pounds per day of five-day BOD, including projected future development. The Texas Water Quality Board, in cooperation with technical personnel of the EPA, shall review existing waste discharge orders with the objective of allocating allowable five-day BOD waste loads for sources discharging to the Houston Ship Channel such that the probable 35,000 pounds per day maximum shall not be exceeded. A report will be made to the Conferees on the results of this review by April 1, 1972. The allocation for each waste source as determined by the Texas Water Quality Board, in cooperation with the EPA, shall be attained by December 31, 1974. Interim dates to determine progress toward compliance of the assigned allocation shall be established for each waste source by May 1, 1972.

The Conferees also recognize that discharge of other waste constituents such as, but not limited to, chemical oxygen demand, suspended solids, complex organics, and other toxic materials also contribute to the pollution of Galveston Bay and its tributaries. An allocation of allowable waste discharges for these pertinent parameters from each waste source will be established by technical personnel of the Texas Water Quality Board and the EPA consistent with best available treatment practices and such allocation will be reported to the Conferees by September 1, 1972.

The Conferees recognize that technical considerations may require a reassessment of this schedule in the case of some of the municipal and industrial waste sources to be considered. These necessary reassessments will be determined by technical personnel of the Texas Water Quality Board and the EPA, and recommendations concerning schedule changes will be made to the Conferees at six month intervals.

The foregoing recommendations shall not be construed as in any way foreclosing or interfering with Federal, State or local statutory proceedings relating to the authorization, amendment, or revocation of Federal or State waste discharge permits or orders, nor shall such recommendations operate to delay or prevent the creation or operation of regional waste disposal systems such as the contemplated Gulf Coast Waste Disposal Authority.

2. Discussion

A program was undertaken in December 1971 to allocate all permitted BOD discharges into the Houston Ship Channel such that the total load would not exceed 35,000 pounds per day. In developing the BOD allotment, no technical conferences were conducted with the affected entities. The reductions were generally balanced between industrial and municipal discharges. To meet the allowable limits set on BOD and other pollution parameters; advanced treatment is necessary. The proposed allocation made no allowance for future growth in the area.

Public hearings were held on February 7 and 8, 1972, in Baytown to discuss the revised requirements for municipal effluent. Similar hearings were held on February 9, 10 and 11 to discuss the proposed industrial effluent criteria. The public hearing notices, allocations and related documents are contained in Attachment 4, and Table X-1.

It is acknowledged that the BOD allocation did not take into account the record of progress towards abatement by many of the sources or potential growth in the area and is based upon an equal treatment level for all sources regardless of present abatement practices. The hearings were scheduled in the afternoons and evenings to provide the opportunity for all interested parties to participate. The majority of testimony, however, was offered by the municipal and industrial sources to which these allocations apply. Very little general public participation was manifest. The overwhelming impact of the testimony offered was that the allocations proposed were technologically impractical and economically unfeasible.

As a result of these hearings, Texas Water Quality Board has decided to pursue a program of abatement consistent with the requirements of best practicable control technology currently available as determined by the Texas Water Quality Board and the Environmental Protection Agency. Under this program, waste discharges to the Houston Ship Channel from both municipal and industrial sources will be reduced to less than 60,000 pounds per day by December 1973. During this period, consultations will be held between the Texas Water Quality Board and the Environmental

TABLE X-1

B.O.D. ALLOCATIONS TO HOUSTON SHIP CHANNEL

Industrial Discharges

PAGE 1

			Permitted Discharge (Avg.)			Present Discharge (Avg.)		Proposed Discharge (Avg.)		
Name	WCO #	Page	Flow MGD	BOD mg/l	BOD lbs/day	Flow MGD	BOD lbs/day	Flow MGD	BOD mg/l.	BOD lbs/day
Anchor Hocking Glass Corp.	01170	01	0.028	20	< 10	0.062	82	0.028	10	< 10
Armco Steel Corporation	00509	01	0.72	10	60	0.77	32	0.72	10	60
		02	no reg.			no discharge		*		
		04	no reg.			no discharge		*		
		5 & 6	4.80	25	1001	3.47	58	3.47	10	290
		07	no reg.			no discharge		*		
		08	no reg.			no discharge		*		
		91	35.00	11		16.00	100% Cooling water	35.00	no net increase	
		92	0.72	100		0.48	16	0.48	13	52
		10	2.60	100	217	no discharge		no discharge allowed		
		11	2.60	100	217	1.50	2888	injection or incineration		
		12	no reg.			no discharge		*		
		13	no reg.			no discharge		*		
		14	no reg.			no discharge		*		
		15	1.08	25		1.26	21	1.08	10	90
		16	no reg.			no discharge		*		
Ashland Chemical Company	00549	01	1.38	50	575	0.60	200	0.60	20	100
Atlantic Richfield	00392	01	no reg.			0.98	427	*	Process waste to separated & added to # 2 outfall	
		02	7.50	100	6255	4.80	3681	4.8	20	800
		03	no reg.			0.029	<1	*		
		04	no reg.			0.08	7	*		
		05	no reg.			1.57	681	1.57	20	262
		06	0.36	no reg.		0.23	12	0.23	10	20

TABLE X-1 (Cont.)

PAGE 2

Industrial Discharges

Name	WCO #	Page	Permitted Discharge (Avg.) Flow MGD	Permitted Discharge (Avg.) BOD mg/l	Permitted Discharge (Avg.) BOD lbs/day	Present Discharge (Avg.) Flow MGD	Present Discharge (Avg.) BOD lbs/day	Proposed Discharge (Avg.) Flow MGD	Proposed Discharge (Avg.) BOD mg/l	Proposed Discharge (Avg.) BOD lbs/day
Celanese Plastic Company	00544	01	0.425	15	53	0.37	12	0.37	10	30
Charter International Oil	00535	01	2.16	50	900	1.45	1,512	1.45	20	242
		02	0.72	50	300	0.03	<1	0.03	10	<10
Chemical Exchange Processing Co.	00786	01	0.144	100	120	0.025	11	0.025	20	8
Cook Paint & Varnish Company	00427	01	0.08	no reg.		0.25	95	0.25	13	27
Crown Central Petroleum	00574	01	4.00	125	4,170	2.14	2,490	2.14	20	357
		02	0.86	125	897	0.50	261	0.50	20	83
		03		no reg.		no discharge		*		
Diamond Shamrock Corporation	00749	01	0.39	100	325	0.11	45	0.11	20	18
	00305	01	3.80	20	634	2.90	17	3.80	no net increase	
		02	98.00	20	16,346	89.40	373	98.00	no net increase	
		03	42.00	50	17,514	28.88	193	42.00	no net increase	
		04	0.65	30	163	0.003	<10	0.003	20	<10
		05	4.80	20	801	2.44	42	4.80	no net increase	
		06	3.0	no reg.		no discharge		no disch.		
E. I. DuPont de Nemour & Co.	00474	01	8.00	50	3,336	7.00	3,580	7.00	20	1,168
Enjay Chemical Company	00610	01	0.20	90	150	0.14	55	0.14	20	23
Ethyl Corporation	00492	01	3.68	220	6,752	3.32	2,191	3.32	20	554
		02	4.75	no reg.		4.919	205	4.75	no net increase	
		03	8.00	no reg.		6.076	286	8.00	no net increase	

TABLE X-1 (Cont.)

PAGE 3

Industrial Discharges

Name	WCO#	Page	Permitted Discharge (Avg.) Flow MGD	Permitted Discharge (Avg.) BOD mg/1	Permitted Discharge (Avg.) BOD lbs/day	Present Discharge (Avg.) Flow MGD	Present Discharge (Avg.) BOD lbs/day	Proposed Discharge (Avg.) Flow MGD	Proposed Discharge (Avg.) BOD mg/1	Proposed Discharge (Avg.) BOD lbs/d
Goodyear Tire & Rubber Co.	00520	01	1.650	40	550	1.470	131	1.47	10	122
		02	2.50	60	1,251	2.48	331	2.48	13	269
Hess Terminals	00671	01	0.108	100	90	0.057	19	0.057	20	<10
Houston Lighting & Power	01031	01	1.12	10	93	0.79	132	1.12	no net increase	
Hughes Tool Company	01046	01	0.104	20	18	0.104	<10	0.104	10	<10
		02	0.092	20	15	0.092	<10	0.092	10	<10
		03	0.207	10	17	0.207	<10	0.207	10	17
		04	0.587	15	73	0.50	103	0.50	13	54
		05	0.090	no reg.	no reg.	0.090	<10	*		
Humble Oil & Refining	00592	01	no reg.			no discharge		*		
		02	25.00	50	10,425	19.35	3,228	19.35	13	2,098
Ideal Cement Company	00456	01	0.50	30	125	0.40	26	0.40	13	43
		02	0.075	30	19	no discharge		no discharge		
		03	0.030	20	5	no discharge		no discharge		
Lubrizol Corporation	00639	01	1.00	100	834	0.72	155	0.72	20	120
		02	no reg.					*		
Olin Corporation	00649	01	12.700	no reg.		12.112		12.112		
		02	1.490	no reg.		no discharge		1.490		
		03	7.050	no reg.		2.744		2.744		
		04	0.034	20	<10	no discharge		0.034	10	<10
		05	0.450	no reg.		5.459		0.450		
		06	to be assigned	no reg.		0.168				
Pennwalt Chemical Corporation	00445	01	0.20	50	83	0.10	23	0.10	20	17
Petroleum & Mining Division	00635	01	0.72	60	361	1.19	84	0.72	13	78
Petro Tex Chemical Corporation	00587	01	1.00	25	209	0.98	29	1.00	10	84
		02	6.25	100	5,212	4.66	3,134	4.66	20	777
		03	0.90	35	263	0.42	83	0.42	20	70
Phillips Petroleum Company	00815	02	1.900	50	792	2.443	115	1.900	5	79
		03	5.000	no reg.		no report		*		
	00975	01	0.100	2	<10	0.178	<10	0.100	2	<10
	01061	01	0.090	2	<10	0.125	<10	0.090	2	<10
Premier Petrochemical	01045	01	0.15	100	125	0.17	181	0.15	20	25
Reichold Chemical Inc.	00662	01	0.02	100	17	0.045	375	0.02	20	3
Rohm and Haas	00458	01	1.728	100	1,441	2.60	8,542	1.728	20	288
		02	0.072	80	48	0.13	146	0.072	20	12
		03-	Equal to or better than Zone II Req's							

TABLE X-1 (Cont.)

PAGE 4

Industrial Discharges

Name	WCC#	Page	Permitted Discharge (Avg.) Flow MGD	Permitted Discharge (Avg.) BOD mg/1	Permitted Discharge (Avg.) BOD lbs/day	Present Discharge (Avg.) Flow MGD	Present Discharge (Avg.) BOD lbs/day	Proposed Discharge (Avg.) Flow MGD	Proposed Discharge (Avg.) BOD mg/1	Proposed Discharge (Avg.) BOD lbs/day
Shell Chemical Company	00402	01	6.10	100	5,087	5.79	1,076	6.10	13	661
		02	no reg.					*		
Shell Oil Company	00403	01	1.44	10	120	1.47	49	1.44	10	120
		02	0.288	30	72	no discharge		no discharge		
		03	0.144	20	24	0.044	4	0.044	13	5
		04	0.576	10	48	0.72	36	0.58	10	48
		05	no reg.					*		
		06	0.086	10	7	0.062	2	0.086	10	8
		07	0.216	20		0.049	6	0.05	13	5
		08	no reg.					*		
		09	0.266	15	,33	0.178	11	0.178	13	19
		10	4.752	30	1,189	4.47	671	4.47	13	485
		11	no reg.					runoff from dredging ope tions		
		12	2.664	50	1,109	0.55	41	0.55	13	60
Sinclair Koppers Chemical Co.	00[illegible]93	01	0.55	100	459	0.76	1,134	0.55	20	92
Sinclair Petrochemical Co.	00391	01	2.66	50	1,109	1.88	294	1.88	20	314
Smith A. O. Corporation	00572	01	0.850	50	354	0.267	51	0.267	10	22
SMS Industries, Inc.	01[illegible]52	01	0.115	50	48	0.114	20	0.114	10	<10
Southland Paper Mills	01[illegible]0	01	50.00	100	41,700	12.35	2,678	12.35	13	1,339
Stauffer Chemical Company	00541	01	1.13	20	188	0.62	36	0.62	13	67
		02	0.045	20	8	0.019	<10	0.019	10	<10
Stauffer Chemical Company	00542	01	1.00	20	167	1.43	155	1.00	13	108
Tenneco Chemical, Inc.	00002	01	1.00	100	834	0.67	133	0.67	20	112
Texas Instruments	01225	01	0.644	20	107	0.433	24	0.433	10	36
Union Equity Cooperative Exchange	01205	01	0.0015	16	<1	0.31	52	0.0015	13	<1
Upjohn Company, The	00663	01	0.58	150	726	0.94	347	0.58	20	97
United States Gypsum Co.	00353	01	0.50	100	417	0.28	50	0.28	13	30
		03	0.0283	3		no reports	no discharge			
U.S. Industrial Chemical	00534	01	0.90	25	188	1.00	91	0.90	13	98
		02	0.43	40	143	0.17	95	0.17	20	28
U.S. Plywood	00640	01	44.00	50	10,348	37.90	6,323	37.90	13	4,109
		02	no reg.					*		
		03	no reg.					*		

Storm water runnoff only.

Protection Agency with individual waste discharges to determine specific waste load allocations and implementation dates by these sources for meeting the Federal-State water quality standards for the Houston Ship Channel. The present program of limiting effluents to 60,000 pounds per day is an interim step and is not expected to meet presently approved State-Federal water quality standards in the Houston Ship Channel nor the Conferees' Recommendation Number 13. This program of reduction of wastes to less than 60,000 pounds per day of five-day BOD will represent a reduction of greater than 85 percent from waste loads discharging to the Houston Ship Channel during 1968.

ATTACHMENT NO. 1

TEXAS WATER QUALITY BOARD

ORDER NO. 71-0819-1

AND

ADDENDUM

TEXAS WATER QUALITY BOARD
P. O. Box 13246
Capitol Station
Austin, Texas 78711

ORDER NO. 71-0819-1

AN ORDER of the Texas Water Quality Board ordering and establishing dates for the completion of certain improvement projects and studies pertaining to the sewerage facilities owned by the City of Houston.

PREAMBLE

In order to assure that the effluents being released by the City of Houston, Texas, from its several sewage treatment plants are brought in an orderly and timely fashion into compliance with applicable waste control orders issued by the Texas Water Quality Board and to abate the present pollution of waters within and adjoining the City of Houston, the Texas Water Quality Board has ordered the City of Houston to undertake a sanitary sewerage system improvement program.

The purpose of this order is to clearly set forth some portions of the improvement program which the Texas Water Quality Board has directed the City of Houston to complete and the timetable for the completion of various phases or portions of this program.

The completion dates shown in this order are considered by the Board to be reasonable and proper, and were determined after due consideration had been given to the dates contained in the City of Houston's Waste Treatment Progress Report of August 19, 1971, during a public hearing held by the Board on August 19, 1971.

It is the intent of the Texas Water Quality Board that the City adhere to the dates established and unless the particular phase or portion of the improvement program due for completion is completed on or before the required date, or unless the City has requested and the Board approved for acceptable reason or reasons an extension of the improvement program; the

Board herein places the City of Houston on notice that it intends to seek such relief as may be indicated in the courts. Now, therefore,

BE IT ORDERED BY THE TEXAS WATER QUALITY BOARD:

I. DEFINITIONS FOR THIS ORDER:

A. "Board" means the Texas Water Quality Board.

B. "City" means the City of Houston, Texas.

C. "Executive Director" means the Executive Director of the Texas Water Quality Board.

D. "Staff" means the staff of the Texas Water Quality Board.

II. Report Regarding Project Completion Dates

A report outlining completion dates for the following projects will be submitted to the Board on or before December 1, 1971: (a) abandonment of the unpermitted plant at Western Acres and the sewage treatment plants outlined on pages 8, 14, 21, 22, 25, 41, 45, 46, 47, 49, 55, 58 of the City's Waste Control Order No. 10495, (b) the enlargement of sewage handling facilities at sewage treatment plants covered by pages 15, 16, 30, 43, 44, 65, and 69 of the City's Waste Control Order No. 10495, (c) provide sludge handling and chlorination facilities at the Sims Bayou sewage treatment plant, (d) provide treatment for the waste from the water treatment plant covered by page 68 of the City's Waste Control Order No. 10495. After review and concurrence with these completion dates by the Board, they will become part of this Board Order.

III. Bacteriological Study

In order to determine the efficacy, or lack thereof, of the sanitary sewerage system in abating the bacteriological pollution of the various drainageways within the City, and to identify the source or sources of excessive bacterial pollution; the City Water Pollution

Control Division of the City Health Department is directed to continue and expand its bacteriological water quality sampling program. The sampling points shall be located so as to determine the impact of the various treated effluent discharges and known recurring overflows, and in cooperation with the Texas Water Quality Board's District 7 staff. The data generated by this program shall be forwarded at appropriate regular intervals to the Texas Water Quality Board and appropriate persons in the City Administration, including the Sewer Department.

IV. Report Regarding Chlorination and Suspended Solids

A report outlining (a) the reason or reasons for the lapses in chlorination at the various plants and programmed corrective action, and (b) the capability of the various permanent sewage treatment plants as identified in the City's progress report of August 19, 1971, to comply with suspended solids requirements when fully loaded will be submitted to the Board on or before March 1, 1972.

V. Overflow of Raw Sewage, McGregor Park

The City is directed to take positive action to expedite the project to eliminate the recurring overflow of raw sewage into Brays Bayou adjacent to McGregor Park. A report on the action taken will be submitted on or before March 1, 1972.

VI. Correction of Existing Inadequate Conditions

The City is directed to take immediate action to correct the following conditions (the page numbers refer to Waste Control Order No. 10495)

(1) no flow recorder--Chocolate Bayou plant, p. 9.
(2) inadequate flow measuring device--F.W.S.D. 17, p. 15.
(3) industrial waste problem--F.W.S.D. 17, p. 15.
(4) improperly handled screening--F.W.S.D. 17, p. 15.
(5) no sludge disposal facilities--New Homestead plant, p. 23.
(6) no flow measuring device--Easthaven, p. 65.
(7) inoperative flow recorder--F.W.S.D. 34, p. 69.
(8) inoperative sludge collector and mechanical aerator--W.C.I.D. 44-1, p. 47.
(9) bypass from aeration tank--Airport, p. 78.

A report on the corrections accomplished will be submitted on or before March 1, 1972.

VII. Apply for Waste Control Orders

The City is directed to file with the Texas Water Quality Board appropriate applications or other documents and to take such other actions as may be appropriate to secure valid waste control orders for the sewage treatment facilities listed below. To facilitate the securement of such waste control orders, the City shall consult with the Hearings and Enforcement Division of the Texas Water Quality Board by November 1, 1971 on the documents required and shall submit in an expeditious manner such documents as may be determined.

Expire Page	Name	Expiration Date
8	Chatwood Place	12-31-68
14	Fontaine Place	12-31-66
15	F.W.S.D. 17	6-30-67
21	Gulf Palms	12-31-68
22	Gulfway Terrace	12-31-68
25	Lake Forest	12-31-68
29	Longwoods	6-30-67
44	W.C.I.D. 34	12-31-68
45	W.C.I.D. 39	12-31-66
46	W.C.I.D. 42	12-31-66
47	W.C.I.D. 44-1	12-31-69
49	W.C.I.D. 44-3	12-31-68
--	Western Acres	--
--	W.C.I.D. 82	--

VIII. Sludge Disposal Facilities

The City is directed to submit by December 1, 1971 a report on an analysis of the adequacy and reliability of the sludge disposal facilities at the Northside and Sims Bayou plants. The report should outline alternates available to rectify deficiencies found, if any.

IX. Infiltration Abatement Program

The City is directed to continue and complete its existing infiltration study and abatement program as set forth in the report dated November 16, 1970. Further, the City is directed to submit by May 1 each year a report on the progress made.

X. Funding Sanitary Sewerage System

The City is directed to provide the funding necessary to effectuate the recommendations enumerated in this Board Order.

XI. Long-Range Sanitary Sewerage Planning

The City is directed to keep its long-range sanitary sewerage plan current.

With respect to implementing the long-range plan, the City is directed to exercise the provisions of extraterritorial legislation to accomplish the following:

(1) Insure that alterations which may from time to time be required in the long-range plans of the City and the Houston-Galveston Area Council are fully coordinated in such a manner that the plans remain compatible.

(2) Insure that proposed sanitary sewerage facilities or modifications to such facilities within the extraterritorial jurisdiction area are compatible with the City's long-range plan.

(3) Insure that the design and construction of facilities within the extraterritorial jurisdiction area conform with the minimum requirements of the City.

In the City's comments on applications to the Texas Water Quality Board for waste control orders, the City will furnish to the Board: (1) an analysis showing that the sanitary sewerage facilities proposed are compatible with the regional plan, (2) the City's approval or rejection of the plans and specifications, including arrangements made for construction inspection, for such facilities, and (3) the City's approval of the plumbing code to be required in the area served by the particular entity involved.

XII. EXTENSION OR WAIVER: If at any time it becomes evident to the City that difficulty will be experienced in complying with the completion dates enumerated in this order, the City shall immediately request by letter addressed to the Board's Austin Office to be placed on the next Board Meeting agenda to request that the completion date or dates be extended or waived. The City shall, upon notification that they have been placed on the agenda, have a representative or representatives attend the Board Meeting to present their reason or reasons for requesting an extension or waiver. The Board will, upon considering the data or evidence presented, determine the acceptability of the reasons, and notify the City in writing that the request for an extension or waiver as the case may be is granted or denied.

XIII. EFFECTIVE DATE: This order is effective immediately upon its adoption by the Board.

XIV. NOTIFICATION PROVISION: The Executive Director is directed to send a copy of this order to the City of Houston, Texas.

XV. SEVERANCE CLAUSE: If any provision, sentence, clause, or phrase of this order is for any reason held to be invalid, such invalid portion shall not affect the validity of the remaining portions of this order. The Board hereby declares that it would have passed the valid portions of this order irrespective of the fact that any one or more portions be declared invalid.

Passed and approved this 19th day of August, 1971

TEXAS WATER QUALITY BOARD

CHAIRMAN

(Seal)

ATTEST:

Hugh C. Yantis, Jr., Executive Director

ADDENDUM TO BOARD ORDER NO. 71-C819-1

Article II of this order requires the City of Houston to submit to the Texas Water Quality Board a report containing completion dates for a number of projects. This report has been received and reviewed by the Board. The Board concurs with the completion dates, which are shown on the following pages, and hereby incorporates them as requirements of this order.

Passed and approved this ____ day of _____, 1972.

TEXAS WATER QUALITY BOARD

GORDON FULCHER, CHAIRMAN

(Seal)

ATTEST:

Hugh C. Yantis, Jr., Executive Director

ADDENDUM TO BOARD ORDER 71-0819-1

Page	Name	Action	Completion Date
	Western Acres	Abandon	03-11-72
8	Chatwood Place	Abandon	12-15-72
25	Lake Forrest	Abandon	12-15-72
14	Fontaine Place	Abandon	08-15-73
45	WCID #39	Abandon	08-15-73
46	WCID #42	Abandon	08-15-73
21	Gulf Palms	Abandon	06-01-74
22	Gulfway Terrace	Abandon	06-01-74
20	WCID #20	Abandon	12-31-74
47	WCID #44-1	Abandon	04-30-73
49	WCID #44-3	Abandon	04-30-73
15	FWSD #17	Enlarge	06-30-73
16	FWSD #23	Enlarge	12-01-72
30	West District	Enlarge	04-30-73
43	WCID #32	Enlarge or Abandon	12-31-74
44	WCID #34	Abandon	12-31-74
65	Easthaven	Enlarge	07-01-74
69	FWSD #34	Enlarge	12-31-72
68	Sims Bayou	Chlorination	12-31-72
68	Sims Bayou	Provide Sludge Facilities	12-31-72
	Water Treatment Plant	Provide Treatment	12-30-74

ATTACHMENT NO. 2

TEXAS WATER QUALITY BOARD

ORDER NO. 69-9A

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TEXAS WATER QUALITY BOARD
1108 Lavaca Street
Austin, Texas 78701

ORDER NO. 69-9A

AN ORDER of the Texas Water Quality Board determining that the regional plan, contemplated in Texas Water Quality Board Order No. 69-9, has failed to materialize within a reasonable time period; further determining that the immediate implementation of the advanced waste treatment and other requirements contained in Section 3 (pages 4 and 5) of that Order is necessary to preserve and maintain the quality of water in Clear Lake and to prevent the continued pollution of the lake; ordering all dischargers of domestic wastewaters within the Clear Lake Watershed to comply with the aforementioned requirements within such period of time as is reasonably required but not to exceed two (2) years from the date of the adoption of this Order; ordering that these requirements be made a part of the waste control orders (permits) held by these waste dischargers; and establishing a program for compliance with these requirements.

WHEREAS, under the provisions of Texas Water Quality Board Order No. 69-9, the Board announced:

"That in the event that the plan for the protection of Clear Lake, contemplated in this Order, fails to materialize within reasonable time limitations, the Board will, of necessity, be compelled to consider and seek more stringent permit requirements for each waste discharger in the watershed. These requirements will be determined on a case-by-case basis but generally would include the following quality parameters:

"(a) Five day biochemical oxygen demand and total suspended solids not to exceed 12 mg/l.

"(b) Chlorine residual of 2 mg/l after one hour detention time and as measured by the orthotolodine test or other acceptable test.

"(c) Nutrients in the effluent will be removed as follows: Nitrogen shall not be regulated and phosphorous, in any form, shall not exceed 1.0 mg/l.

"(d) A fully trained and certified operator will be available to the plant at all times and a satisfactory operation and maintenance program will be required.

"(e) Each discharge will be adequately monitored to insure permit compliance and detect inadequacies of operation. Laboratory services will be made available, by contract or otherwise, to the end that a sampling and analytical program is established to monitor effluent quality on a continuing basis."

WHEREAS, the Board, upon full evaluation of the progress made in achieving the regionalization of sewerage services in the Clear Lake area, finds that, in passage of one year from the date of the adoption of Order 69-9, the planning and the initiation of the construction of the regional waste collection, treatment and disposal system contemplated in that Order has not been successfully accomplished.

WHEREAS, the Board finds that the continued discharge of wastewaters at the presently authorized levels of treatment is causing and will continue to cause the water quality degradation of Clear Lake and jeopardize its further utility as a recreational body of water; and

WHEREAS, the Board finds that, on a long-range basis, the preservation of Clear Lake requires the use of a regional sewer system or systems properly designed according to sound engineering and scientific practices and the Board further finds that its longstanding policy to encourage and foster regional systems will require the following:

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(A) Whenever, in the judgment of the Board, it appears that it is technically and economically feasible for any waste discharging entity within the watershed, be it municipal or industrial, to join into a regional system on an ownership, a contract or other satisfactory basis, the connection or tie-in with the system will be required.

(B) Whenever, in the judgment of the Board, it appears that a local government will construct, operate and administer a regional system in an area and the system is found to be necessary to preserve and maintain the waters in the State, the Board will, pursuant to the provisions of the Texas Water Quality Act, designate the area in need of the system and designate the appropriate local government as the responsible operating entity.

WHEREAS, the Board finds that until such time as a regional sewer system or systems are developed, the immediate implementation of advanced waste treatment requirements is necessary; and

WHEREAS, the Board, in Order 69-9, has previously recognized the fundamentally different nature of industrial wastes as opposed to domestic wastes and has already determined that because the specifics of advanced waste treatment for an industry are not properly amenable to a general order, it will be necessary to review all industrial operations within the watershed on a case-by-case basis and require the equivalent of advanced waste treatment. Now, therefore,

BE IT ORDERED BY THE TEXAS WATER QULLITY BOARD:

1. That all waste dischargers within the Clear Lake Watershed (excluding those discharges that have already been diverted out of the watershed and excluding those dischargers pursuing the acceptable alternatives contained in this Order) are hereby ordered to improve and upgrade their waste treatment facilities and operations in accordance with Section 3

(pages 4 and 5) of Texas Water Quality Board Order No. 69-9.

2. That the advanced waste treatment and other requirements contained in Order 69-9 be and the same are hereby incorporated into and made an operative part of the waste control orders (permits) held by those waste dischargers.
3. That the construction and other work necessary to achieve satisfactory compliance with these new requirements be completed as soon as is reasonably possible but not in excess of two (2) years from the date of the adoption of this Order.
4. That each waste discharging entity within the watershed shall, on or before October 1, 1970, provide the Board with written evidence that it proposes to:
    1. Divert its wastes to some other watershed according to an acceptable plan; or
    2. Combine its wastes with that of some other entity operating a sewerage system; or
    3. Totally contain its wastes so that no discharge will be made; or
    4. Provide tertiary or advanced waste treatment as per this Order.
5. That, in the case of industrial waste dischargers, a similar written document shall be submitted within the same time limitations but that such written evidence shall contain the industry's evaluation of the applicability of the general order to their particular wastewaters and their proposals concerning compliance with the purposes of this Order.
6. That because of the variety of techniques by which advanced waste treatment can be achieved, the specific

requirements for a particular waste discharger may be altered from those shown in Order 69-9 upon a positive demonstration supported by adequate technical evidence that the difference is attributable to the technique employed and not the result of an inferior method of advanced waste treatment and that the technique employed will adequately protect Clear Lake.

7. That all waste dischargers within the purview of this Order shall be required to submit written reports and otherwise comply with the following provisions:

   (A) THOSE ELECTING TO IMPLEMENT ADVANCED WASTE TREATMENT PRACTICES

      1. By December 1, 1970, submit to the Board a written report containing a description of the additional treatment facilities proposed along with appropriate documentation as to the engineering firm or person authorized to proceed with the design of the facilities.
      2. By February 1, 1971, submit written report detailing the proposed fiscal or other programs to be used in constructing and operating the facilities.
      3. By May 1, 1971, submit a complete progress report on all phases of compliance with this Order.
      4. By August 1, 1971, construction of the facilities should commence and a report should be submitted containing the date of the start of construction and the estimated date of completion.
      5. After August 1, 1971, quarterly progress reports shall be submitted and by August 28, 1972, all facilities shall have been completed and in operation.

(B) THOSE ELECTING TO PURSUE DIVERSION OF WASTEWATERS OR OTHER ACCEPTABLE ALTERNATIVES

1. By December 1, 1970, submit a written report containing a description of the specific construction and other arrangements necessary to implement the particular alternative chosen.
2. By February 1, 1971, submit a written report detailing the proposed fiscal or other program to be followed in implementing the alternative.
3. After February 1, 1971, quarterly progress reports shall be submitted until such time as the alternative is fully implemented.

8. That the reports and other written evidence of compliance required by this Order shall be sent to the following address:

Texas Water Quality Board
1108 Lavaca Street
Austin, Texas 78701
ATTN: Field Services

9. That the Field Services Section shall maintain a special file which shall be a complete record of the compliance with these vital reporting provisions and that the Field Services Section shall review each report submitted and keep the Executive Director apprised as to the status of each entity in meeting the provisions of this Order.

10. That the Executive Director be instructed to undertake a program to insure full compliance with this Order, to keep the Board apprised of the status of compliance with the Order, and to seek, in appropriate cases, the fullest possible prosecution of any violations of the terms and

provisions of this Order.

11. That the provisions of this Order shall be applicable to all waste discharges within the Clear Lake Watershed including those waste discharges authorized by Texas Water Quality Board Waste Control Orders issued to the entities listed in Exhibit A of this Order.

Issued this the 28th day of August, 1970.

TEXAS WATER QUALITY BOARD

Gordon Fulcher, Chairman

(Seal)

ATTEST:

Hugh C. Yantis, Jr., Executive Director

ATTACHMENT NO. 3

HOUSTON - GALVESTON AREA COUNCIL

PROPOSED REGIONALIZATION PROGRAM
FOR
WASTE ABATEMENT

GREENS BAYOU AREA

TWQB WCO #	Owning Agency	Receiving Stream	Design Capacity (Avg. Flow)	Estimated Current Load	Role in Proposed Plan
10962	Cypress-Fairbanks I.S.D.	White Oak Bayou	0.025	0.025	Phase into Regional System between 1975 and 1990.
10876	Harris County FWSD #61	White Oak Bayou	0.100	0.100	Phase into Regional System by 1990.
10962	Cypress-Fairbanks I.S.D.	Greens Bayou	0.064	0.060	Phase into Regional System between 1975 and 1990.
10680	City of Jersey Village	White Oak Bayou	0.066	0.066	Phase into Regional System by 1990.
	White Oak Dev. Co.	White Oak Bayou	0.050	0.019	Phase into Regional System by 1990.
10919	Oak Glen Bldg. Co.	Greens Bayou	0.500	None	Phase into Regional System by 1990.
10699	Mayflower Invest. Co	Halls Bayou	0.500	0.025	Phase into Regional System between 1975 and 1990.
10610	Southern San. Corp.	Halls Bayou	0.350	0.350	Phase into Regional System between 1975 and 1990.

GREENS BAYCU AREA

TWQB WCO #	Owning Agency	Receiving Stream	Design Capacity (Avg. Flow)	Estimated Current Load	Role in Proposed Plan
	Trailer Park	Greens Bayou	Unknown	Unknown	Phase into Regional System between 1975 and 1990.
10648	Harris Co. FWSD #45	Greens Bayou	0.053	0.053	Phase into Regional System between 1975 and 1990.
10518	Northern Terrace	Halls Bayou	0.300	0.259	Phase into Regional System between 1975 and 1990.
	No. Houston Ind.	Greens Bayou	Unknown	Unknown	None
10756	Imperial Valley	Greens Bayou	0.300	1.100	Phase into Regional System in 1990 or shortly thereafter.
10809	West Road I.D.	Greens Bayou	0.550	0.100	Phase into Regional System in 1990 or shortly thereafter.
10825	Powell's Nursing Home	Halls Bayou	0.019	0.019	Phase into Regional System between 1975 and 1990.
10419	Durkee Manor	Halls Bayou	0.250	0.122	Phase into Regional System between 1975 and 1990.
10694	Jetero Lumber Co.	Greens Bayou	0.012	0.013	Phase into Regional System by 1975.
10453	Galco Utilities	Halls Bayou	0.108	0.122	Phase into Regional System in 1975 or shortly thereafter.

GREENS BAYOU AREA

TWQB WCO #	Owning Agency	Receiving Stream	Design Capacity (Avg. Flow)	Estimated Current Load	Role in Proposed Plan
10953	Aldine ISD	Greens Bayou	0.035	0.035	Phase into Regional System by 1975.
10436	Crest San. Corp.	Greens Bayou	0.075	0.144	Phase into Regional System by 1975.
10495-78	Houston Int. Airport	Greens Bayou	0.200	0.150	None
10236	Oakwilde Water Co.	Halls Bayou	0.245	0.245	Phase into Regional System shortly after 1975.
	Chatwood Pl.	Greens Bayou	1.000	0.500	Phase into Regional System by 1990.
10679	Harris Co. WCID #74	Greens Bayou	0.250	0.250	An additional 0.65 mgd planned for in the near future will make the plant suitable until about 1990.
10785	Sequoia Estates	Greens Bayou	0.400	0.005	Use until about 1990.
10495-14	City of Houston[1]	Halls Bayou	0.280	0.200	Phase into Regional System by 1975.
10495-45	City of Houston[1]	Halls Bayou	0.522	0.522	Phase into Regional System by 1975.
10451	Harris Co. WCID #76	Greens Bayou	0.300	0.260	Phase into Regional System between 1975 and 1990.

GREENS BAYOU AREA

TWQB WCO #	Owning Agency	Receiving Stream	Design Capacity (Avg. Flow)	Estimated Current Load	Role in Proposed Plan
10737	Harris Co. WCID #69	Greens Bayou	0.565	0.432	Phase into Regional System in 1975 or shortly thereafter.
10336	Eastex Oaks	Greens Bayou	1.000	0.144	Phase into Regional System by 1990.
10495-23	City of Houston	Halls Bayou	1.250	0.867	This plant is being expanded to 5.0 mgd and will serve as Regional Plant.
10495-71	City of Houston	Greens Bayou	0.300	0.168	Phase into Regional System between 1975 and 1990

TWQB WCO #	Owning Agency	Receiving Stream	Design Capacity (Avg. Flow)	Estimated Current Load	Role in Proposed Plan
10400	City of Belvieu	Cedar Bayou	0.075 mgd	0.1 mgd	Abandoned by 1990.
	Barbers Hill ISD	Cotton Bayou	0.015 mgd	Unknown	None
	Lincoln Cedars Subdivision HHM Corp.	Cedar Bayou	0.0025 mgd	Unknown	Phase out upon completion of regional system.
10990	Cedar Bayou Mobile Home Lakliv Inc.	Horsepen Bayou	0.04 mgd	Unknown	Phase out upon completion of regional system.
11109	R. R. Herrington Sr.	Cotton Bayou	0.012 mgd	Unknown	Phase out upon completion of regional system.
	Dutton & Gray	Cotton Bayou	0.012 mgd	Unknown	Phase out upon completion of regional system.
	Bay Ridge Subdivision	Trinity Bay		Unknown	Phase out upon completion of regional system.

TEXAS CITY - LA MARQUE AREA

TWQB WCO #	Owning Agency	Receiving Stream	Design Capacity (Avg. Flow)	Estimated Current Load	Role in Proposed Plan
10770	Bay View MUD	Galveston Bay	0.25	0.01	Abandoned by 1990.
10627	Bacliff MUD	Houston Lighting & Power Outfall	1.00	0.12	Abandoned by 1990.
10173-01	Galveston Co. WCID No. 1 STP #1	Dickinson Bayou	1.20	0.50	Expanded to 2.4 mgd before 1980. Replaced by regional plant A before 1990.
10173-02	Galveston Co. WCID No. 1 STP #2	Dickinson Bayou	0.50	0.06	Expanded to 1.0 mgd before 1980. Replaced by regional plant A before 1990.
10375-01	City of Texas City STP No. 1	Moses Lake	5.00	5.00	Expanded to 14.0 mgd, becomes Regional Plant B.
10375-02	City of Texas City STP No.2	Moses Lake	0.80	0.61	Expanded to 1.6 mgd before 1975. Abandoned by 1990.
10410	City of La Marque	Highland Bayou	1.90	1.90	Expanded to 3.0 mgd before 1980. Abandoned by 1990.
10435	Bayou Vista Subdivision	Highland Bayou	0.05	0.04	Abandoned by 1990.

CLEAR LAKE AREA

TWQB WCO #	Owning Agency	Receiving Stream	Design Capacity (Avg. Flow)	Estimated Current Load	Role in Proposed Plan
10495,79	Houston[1] (SE Plant)	Through ditches to Clear Creek	3.0 mgd	N.A.	Serve as subregional plant; to be completed 1973.
10495,55	Houston[1] (Beverly Hills)	Through ditches to Clear Creek	0.368 mgd	0.40 mgd	Abandon when Houston SE plant is put in operation.
10495,58	Houston[1] (Eastridge)	Through ditches to Clear Creek	0.28 mgd	0.12 mgd	Abandon when Houston SE plant is put in operation.
10522	Harris Co.[1] WCID 81	Turkey Creek, Clear Creek	0.25 mgd	0.25 mgd	Abandon when Houston SE plant is put in operation.
10539	Clear Lake[1] City Water Authority	Horsepen Bayou, Middle Bayou, Mud Lake, Clear Lake	2.25 mgd	1.75 mgd	Serve as subregional plant after advanced treatment modifications completed (probably early 1973)
None	NASA-MSC[1]	Clear Lake	0.31	0.25-0.50 mgd	Abandon after connection is made to CLCWA
None	Pasadena[1] (El Carey)	Clear Lake	Unknown	.04 mgd	Abandon after connection is made to CLCWA

[1] The role for these plants has been firmly established by Board Orders 69-9A and 71-0819-1.

TEXAS CITY - LA MARQUE AREA

TWQB WCO #	Owning Agency	Receiving Stream	Design Capacity (Avg. Flow)	Estimated Current Load	Role in Proposed Plan
10836-02	Flamingo Isle Corp.	Basford Bayou Tributary Canal	0.20	---	Not yet constructed; replaced by regional plant after 1990.
10836-01	Flamingo Isle Corp.	Basford Bayou Tributary Canal	0.20	None recorded	Replaced by regional plant after 1990.
10690	City of Hitchcock	Basford Bayou	0.50	0.29	Expanded to 1.2 mgd before 1975. Replaced by regional plant before 1990.
10174	Galveston Co. WCID No. 8	Highland Bayou	0.04	0.03	Expanded to 0.50 mgd before 1975. Replaced by regional plant before 1990.
10958	Sun Meadows MUD	Dickinson Bayou	0.01	0.005	Served by Clear Creek Planning Sub.
10861	Safari Mobile Home	Magnolia Bayou (A Dickinson Tributary)	0.007	None recorded	Served by Clear Creek Planning Sub.
10771	Texas City Dike Marina	Galveston Bay	0.0005	None recorded	Serves an isolated area.

ATTACHMENT NO. 4

PUBLIC HEARING NOTICE
ON
PROPOSED B.O.D. ALLOCATIONS
FOR
HOUSTON SHIP CHANNEL

GORDON FULCHER
CHAIRMAN
LESTER CLARK
VICE-CHAIRMAN
J. DOUG TOOLE
HARRY P. BURLEIGH

TEXAS WATER QUALITY BOARD

314 WEST 11TH STREET 78701
P.O. BOX 13246 CAPITOL STATION 78711
AUSTIN, TEXAS

JAMES U. CROSS
J. E. PEAVY, MD
BYRON TUNNELL
HUGH C. YANTIS, JR
EXECUTIVE DIRECTOR
PH 475-2651
A.C. 512

RECEIVED
JAN 18

PUBLIC HEARING NOTICE

Pursuant to the recommendations adopted at the recent Galveston Bay Enforcement Conference the pollutant load on the Houston Ship Channel will be lowered such that the aggregate biochemical oxygen demand (BOD) load will not exceed 35,000 lbs. per day in order that approved stream standards will be met. Comparable reductions in other pollutants will also be required.

Therefore, the Texas Water Quality Board will conduct a public hearing to amend all waste control orders for industrial effluents discharged into the Houston Ship Channel and its tributaries (exclusive of the San Jacinto River above the Lake Houston Dam) in order to achieve the above specified BOD loading. These waste control order holders are listed in Table I. The Board will also discuss altering other quality parameters specified in the individual waste control orders including but not necessarily limited to total residue, total suspended solids, volatile suspended solids, settleable matter. chemical oxygen demand (COD), oil and grease, color, heavy metals, toxic compounds, free and floating oil, debris, foaming or frothing material and others. In addition, possible regionalization or combination of waste treatment facilities of both domestic and industrial waste dischargers will be discussed where appropriate.

The public hearings for amending the industrial waste control orders will be held on February 9, 10 and 11 in the Baytown Civic Auditorium, 2407 Market Street, Baytown, Texas. These public hearings will commence at 2:00 p.m. on February 9 and 10 and 8:30 a.m. on February 11. This time schedule has been selected to enable any citizens who desire to participate to attend the public hearings.

The Texas Water Quality Board desires that those persons and entities who will be directly affected by these public hearings be informed of the levels of waste treatment which will be required to meet the established goals. In particular, increases in both capital and operating costs are expected to result from the new

(continued)

requirements of the Board. These public hearings will provide an opportunity for discussion of all aspects of these vital issues.

The public hearings may be continued from time to time and from place to place as necessary to develop the record.

Issued this 13th day of January 1972.

Joe P. Teller, DEPUTY DIRECTOR
Hugh C. Yantis, Jr., Executive Director
Texas Water Quality Board

TABLE I

INDUSTRIAL WASTE CONTROL ORDERS TO BE AMENDED

Name	Waste Control Order Number	Page
Airco Welding Products	00655	01
Air Products & Chemical, Inc.	01280	01
Allied Fence Corp.	01212	01
Anchor Hocking Glass Corp.	01170	01
Aquaness Chemical Div.	00761	01
Ashland Chemical Company	00549	01
Atlantic Richfield	00392	01
"	00392	02
"	00392	03
"	00392	04
"	00392	05
"	00392	06
Baroid Div. Nat Lead Co.	01198	01
"	01198	02
Big Three Welding Co.	00306	01
Brown Oil Tools	00687	01
"	00687	02
"	00687	03

Name	Waste Control Order Number	Page
Cameron Iron Works	00357	01
Cargill Inc.	01247	01
Celanese Plastic Company	00544	01
Charter International Oil	00535	01
"	00535	02
Chemical Exchange Processing Co.	00786	01
Cook Paint & Varnish Co.	00427	01
Crown Central Petroleum	00574	01
"	00574	02
"	00574	03
Diamond Shamrock Corp.	01000	01
Diamond Shamrock Corp.	00749	01
"	00305	01
"	00305	02
"	00305	03
"	00305	04
"	00305	05
"	00305	06
Dresser Industries, Inc.	01262	02
Dresser Magcobar	01211	01
E.I. Dupont de Nemour & Co.	00474	01
Eddy Refining Co.	01018	01

Name	Waste Control Order Number	Page
Enjay Chemical Company	00610	01
Enjay Chemical Company	01215	01
Ethyl Corporation	00492	01
"	00492	02
"	00492	03
General American Transportation	01308	01
"	01308	02
General Portland Cement Co.	00312	01
Gibraltor Galvanizing Co.	01019	01
Goodyear Tire & Rubber Co.	00520	01
"	00520	02
Grief Bros. Cooperage Corp.	01217	01
Groendyke Transport Co.	01057	01
"	01057	02
Gulf Coast Portland Cement	01021	01
Gulf States Asphalt Co., Inc.	01058	01
Helmerick & Payne Inc.	01385	01
Hess Terminals	00671	01
Hooker Chemical Corp.	00733	01
"	00733	02

Name	Waste Control Order Number	Page
Horton & Horton, Inc.	00683	01
"	00684	01
"	00839	01
Houston Lighting & Power Co.	01026	01
"	01027	01
"	01031	01
"	01032	02
"	01032	04
Houston Lighting & Power Co.	01033	01
"	01033	02
"	01033	03
Houston Natural Gas	01286	01
Hughes Tool Company	01046	01
"	01046	02
"	01046	03
"	01046	04
"	01046	05
Ideal Cement Company	00456	01
"	00456	02
"	00456	03
John Mecom & Proler Corp.	01017	01

Name	Waste Control Order Number	Page
Kennecott Copper Corp.	01260	01
Koppers Co., Inc.	01034	01
Lead Products Co. Inc.	01030	01
Lone Star Cement Corp.	00580	01
"	00580	02
Lubrizol Corporation	00639	01
"	00639	02
Merichem Company	00485	01
Missouri Kansas Texas RR	01197	01
Murray Rubber Company	01222	01
National Biscuit Company	01298	01
"	01298	02
"	01298	03
National Supply Division	01036	01
Olin Corporation	00649	01
"	00649	02
"	00649	03
"	00649	04
"	00649	05
"	00649	06
Parker Bros. & Co., Inc.	00668	01
"	00797	01
"	00801	01

Name	Waste Control Order Number	Page
Parker Bros. & Co. Inc.	00806	01
"	00809	01
Pennwalt Chemical Corporation	00587	01
Petro Tex Chemical Corp.	00587	01
"	00587	02
"	00587	03
Petrochemical Investment Corp.	01301	01
Petroleum & Mining Division	00635	01
Petrolite Corporation	00347	01
Philip Capey Mfg. Co.	00660	01
Phillip Petroleum Company	00815	02
"	00815	03
"	00975	01
"	01061	01
Phosphate Chemical Inc.	01194	01
"	01194	02
Plastic Applicators, Inc.	01150	01
PPG Industries Inc.	01224	01
"	01224	02
Premier Petrochemical	01045	01
Reddy Ice Div.	01279	01
Reichold Chemical Inc.	00662	01
Rohm and Haas	00458	01

Name	Waste Control Order Number	Page
Rohm and Haas	00458	02
"	00458	03
Rollins-Purle Inc	01429	01
Sand & R Oil Co.	01063	01
Shell Chemical Company	00402	01
"	00402	02
Shell Oil Company	00403	01
"	00403	02
"	00403	03
"	00403	04
"	00403	05
"	00403	06
"	00403	07
"	00403	08
"	00403	09
"	00403	10
"	00403	11
"	00403	12
Sinclair Koppers Chemical Co.	00393	01
Sinclair Petrochemical Co.	00391	01
Smith A.O. Corp.	00672	01
Smith Industries, Inc.	00686	01

Name	Waste Control Order Number	Page
SMS Industries Inc.	01062	01
Southern Pacific Co.	01180	01
"	01181	01
Southland Paper Mills	01160	01
Southland Paper Mills, Inc.	01161	01
Southwest Chem. & Plastic Co.	01229	01
Stran Steel Corp.	01259	01
Stauffer Chemical Co.	00541	01
"	00541	02
Stauffer Chemical Co.	00542	01
Superior Oil Company	01232	01
Swift Agricultural Chem. Corp.	01421	01
Tenneco Chemical, Inc.	00002	01
Tenneco Oil Company	00440	01
Texaco, Inc.	00413	01
"	00413	02
"	00413	03
"	00413	04
"	01172	02
Texas Instruments	01225	01
Todd Shipyards	01159	01

Name	Waste Control Order Number	Page
Tube Associates Inc.	01423	01
Union Carbide & Chemical Co.	01173	01
Union Equity Cooperative Exchange	01205	01
United States Gypsum Company	00353	01
"	00353	03
Upjohn Company, The	00663	01
U.S. Industrial Chemical	00534	01
U.S. Industrial Chemical	00534	02
U.S. Plywood	00640	01
"	00640	02
"	00640	03
Uvalde Rock Asphalt Co.	00785	01
Zavalla Sand Company	00545	01

GORDON FULCHER
CHAIRMAN
LESTER CLARK
VICE-CHAIRMAN
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314 WEST 11TH STREET 78701
P.O. BOX 13246 CAPITOL STATION 78711
AUSTIN, TEXAS

January 17, 1972

F:DW

To the Holder of Waste Control Order No.

Gentlemen:

In accord with the enclosed notice, a public hearing will be held with the objective of lowering the authorized 5-day BOD load on the Houston Ship Channel to 35,000 lbs. per day and to also require reductions in other pollution parameters. It is our intention to require, insofar as possible, a comparable effort by all of the industrial waste dischargers in the area covered by the notice. We have attempted to define the effluent quality for each waste control order holder on the Houston Ship Channel pursuant to this objective. It must be recognized that the waste load allotment to the various individual waste control order holders is as yet imperfect, and that the individual allotments may and undoubtedly will be altered as additional data is developed during the course of the hearing and/or subsequent conferences. Consequently, the attached table showing the effluent requirements for the various industries is being furnished to you to indicate the magnitude of the necessary waste treatment effort, and to assist you in preparing for the hearing.

You should come to the hearing prepared insofar as possible, to discuss fully your company's capability to comply with the proposed effluent quality, and the date by which compliance can be attained--bearing in mind the December 31, 1974 deadline imposed by the findings of the EPA Shellfish Enforcement Conference. The testimony relating to time requirements should be broken into sections with time intervals or interim dates for the accomplishment of engineering, financing, and construction specified.

It is recognized that minimizing the number, within limit, of waste treatment facilities by the creation of regional or subregional waste disposal systems is a desirable goal and this is recognized in the recommendations of the EPA Shellfish Enforcement Conference. In view of the necessity of maintaining the BOD load below 35,000 lbs. per day now and in the future, the treatment levels required to maintain this requirement dictate that advance waste treatment practices be employed. This factor lends additional weight to the desirability of regional or subregional systems. Minimizing the number of treatment facilities, particularly if owned and operated by one entity such as the Gulf Coast Waste Disposal Authority, will enhance the ability to provide for future industrial and municipal growth and remain with the specified 35,000 lbs. per day. For these reasons, we would suggest that you give very serious and immediate consideration to participation in a regional system.

Very truly yours,

Joe P. Teller
for

Hugh C. Yantis, Jr.
Executive Director

ccs: W. A. Quebedeaux, Jr., Ph.D., Director
  Harris County Pollution Control Department
L. D. Farragut, M.D., Director
  Harris County Health Department
The Honorable Jim Clark
  Texas House of Representatives
Honorable Bill Elliott
  Harris County Judge
Mr. Joe Resweber
  Harris County Attorney
Mr. Jamie H. Bray
  Commissioner - Precinct 2
Mr. L. Jack Davis, General Manager
  Gulf Coast Waste Disposal Authority
Texas Water Quality Board District 7

MR. GALLAGHER: Thank you.

On January 7, 1972, Mr. William D. Ruckelshaus, Administrator of the Environmental Protection Agency, sent a letter to Mr. Hugh C. Yantis, Executive Director of the Texas Water Quality Board, officially transmitting the recommendations of the Galveston Bay Enforcement Conference. I would now like to read these recommendations:

> 1) The Federal conferee concluded that there is occurrence of pollution of interstate or navigable waters due to discharges from municipal and industrial sources subject to abatement under the Federal Act.
>
> The State conferee took the position that the conference was called under the shellfish provisions of the Act and that while there is pollution occurring in the waters covered by this conference, it has not been demonstrated that substantial economic injury results from the inability to market shellfish products in interstate commerce.
>
> 2) While measures have been taken to reduce such pollution, they are not yet adequate.
>
> 3) Delays encountered in abating the

pollution have been caused by the enormity and complexity of the problem.

4) The Food and Drug Administration, in cooperation with appropriate State regulatory agencies, will continue its recently initiated national study of oil and hydrocarbon residues in oysters, including those taken from Galveston Bay, with the objective of determining toxicological effects, if any, of such concentrations. These data, and any evaluations, will be made available to the conferees of the Galveston Bay enforcement conference.

5) To insure that approved shellfish harvesting areas are properly classified at all times, sampling for determining bacteriological acceptability of areas for shellfish harvesting in Galveston Bay shall continue to emphasize the most unfavorable hydrographic and pollution conditions. The most unfavorable hydrographic and pollution conditions will be determined by technical personnel of the Texas State Health Department in cooperation with the Food and Drug Administration and other Federal, State and local

agencies.

6) Effective disinfection of all waste sources contributing bacteriological pollution to the Galveston Bay system will be provided. The Texas Water Quality Board policy to this effect shall continue to be implemented. Where effective disinfection is not presently being accomplished, it is recognized that adequate measures are underway to secure that disinfection. These measures shall be in effect by December 31, 1971.

The Texas Water Quality Board will continue to implement its policy regarding the elimination of small plants. The centralization of facilities, wherever possible, and the halt of proliferation of small plants will continue, consistent with existing appropriate procedures. The implementation schedule for this program, as initiated by the Texas Water Quality Board, will be made available to the conferees of the Galveston Bay enforcement conference not later than April 1, 1972.

7) The Environmental Protection Agency and the Texas Water Quality Board will cooperate

in a study of Galveston Bay. This study is presently being conducted by the Texas Water Quality Board on all sources of municipal and industrial wastes permitted by the Texas Water Quality Board to discharge effluent to Galveston Bay and its tributaries. These examinations shall emphasize determination of complex organic compounds, heavy metals and other potentially toxic substances, as well as oil and grease, from each waste source. Recommendations and scheduling of necessary abatement will be provided to the conferees as soon as they become available. The Texas Water Quality Board permits and self-reporting data system will be amended as necessary to reflect the recommendations of this waste source survey. A progress report on results of this study will be made to the conferees within 6 months of the date of the reconvened session of the Galveston Bay enforcement conference.

8) The Texas Water Quality Board will continue its review of each waste source discharging to Galveston Bay and its tributaries and will amend those permits as necessary to

insure that the best reasonable available treatment is provided relative to discharges of oil and grease. The Texas Water Quality Board will cooperate with EPA and local governments in determining what treatment is the best reasonable available treatment. It is recognized that improvements in technology will be incorporated into future permit provisions. A progress report will be made to the conferees within 6 months of the date of the reconvened session of the Galveston Bay enforcement conference.

9) The ongoing review and amendment by the Texas Water Quality Board of existing permits recognizes that greater reductions of waste will be required of waste dischargers to the Galveston Bay system to meet water quality standards. The conferees note that in the past 3 years the organic waste load being discharged into the Houston Ship Channel has been lowered from about 430,000 lbs/day of BOD to 103,000 lbs/day of BOD. Any amendments to existing or new Texas Water Quality Board waste control orders as a result of this program will prohibit dilution as a substitute for treatment.

A progress report on continuing reduction of waste loads will be provided to the conferees within 6 months of the date of the reconvened session of the Galveston Bay enforcement conference.

10) A characterization and evaluation of the water quality significance of materials from pollution sources contained in the organic sludge dredged from the Houston Ship Channel shall be conducted. Based on the results of this evaluation and examination of present spoil disposal areas, recommendations will be made by the Texas Water Quality Board and the Environmental Protection Agency on location of suitable spoil disposal areas and other appropriate action to minimize or eliminate deleterious effects on water quality.

11) If alert levels for acute and chronically toxic or growth inhibiting factors are developed by the Food and Drug Administration for shellfish from all approved national growing waters, including Galveston Bay, the appropriate Texas agencies and the Environmental Protection Agency, in cooperation with the Food and Drug Administration and other appropriate Federal

agencies, will work to develop requirements for the same characteristics in waters approved for shellfish harvesting.

12) Chemical constituents causing color in waste effluents, such as those from pulp and paper mills, shall be reduced to natural background in area waters as soon as practicable as stated in existing Texas Water Quality Board waste control orders. A report on feasible processes to accomplish this recommendation shall be submitted to the conferees within 6 months of the reconvened session of the Galveston Bay enforcement conference.

13) To meet present official State-Federal water quality standards established for dissolved oxygen in the Houston Ship Channel, it is expected that the maximum waste load discharged from all sources will be about 35,000 lbs/day of 5-day BOD, including projected future development. The Texas Water Quality Board in cooperation with technical personnel of the Environmental Protection Agency shall review existing waste discharge orders with the objective of allocating allowable 5-day

BOD waste loads for sources discharging to the Houston Ship Channel such that a probable 35,000 lbs/day maximum shall not be exceeded. A report will be made to the conferees on the results of this review by April 1, 1972. The allocation for each waste source as determined by the Texas Water Quality Board, in cooperation with the EPA, shall be attained by December 31, 1974. Interim dates to determine progress toward compliance of the assigned allocation shall be established for each waste source by May 1, 1972.

The conferees also recognize that discharge of other waste constituents, such as but not limited to chemical oxygen demand, suspended solids, complex organics, and other toxic materials, also contribute to the pollution of Galveston Bay and its tributaries. An allocation of allowable waste discharges for these pertinent parameters from each waste source will be established by technical personnel of the Texas Water Quality Board and the EPA consistent with best available treatment practices and such allocation will be reported to the conferees by September 1, 1972.

T. P. Gallagher

The conferees recognize that technical considerations may require a reassessment of this schedule in the case of some of the municipal and industrial waste sources to be considered. These necessary reassessments will be determined by technical personnel of the Texas Water Quality Board and the EPA, and recommendations concerning schedule changes will be made to the conferees at 6-month intervals.

The foregoing recommendations shall not be construed as in any way foreclosing or interfering with Federal, State or local statutory proceedings relating to the authorization, amendment, or revocation of Federal or State waste discharge permits or orders, nor shall such recommendations operate to delay or prevent the creation or operation of regional waste disposal systems such as the contemplated Gulf Coast Waste Disposal Authority.

14) All waste sources which discharge directly to Galveston Bay and other tributary areas, including Clear Lake, shall have allowable waste loads allocated by June 30, 1972, consistent

with best available treatment practices. This allocation shall include interim dates for accomplishment of required waste treatment and/or waste treatment facilities which will be in operation by December 31, 1974. The Texas Water Quality Board will cooperate with EPA and local governments in determining what treatment is the best reasonable available treatment.

15) The following recommendation was not susceptible to joint agreement by the conferees, regarding the Houston Lighting and Power Cedar Bayou Power Plant:

(a) The Texas conferee's recommendation--the once-through cooling system, with discharge to Trinity Bay, proposed for the Cedar Bayou plant shall be carefully monitored to determine whether damage to aquatic life is occurring and/or water quality is being deleteriously affected. If such effects are shown, Houston Lighting and Power Company will take immediate steps to correct the situation.

(b) The Federal conferee's recommendation--

no discharge of cooling water from the Cedar Bayou plant to Trinity Bay shall be permitted. The Houston Lighting and Power Company shall be required to abate the waste heat load by incorporation of a system utilizing recirculation and reuse of cooling water to Tabbs Bay and adjacent waters or location of additional units at suitable alternative sites.

Having read the recommendations, Mr. Chairman, I would now like to summarize the progress toward implementation of those recommendations.

The Galveston Bay Technical Committee was formed by the conferees of the Galveston Bay enforcement conference at the conclusion of the first session in June 1971. The Technical Committee summarized testimony offered at the first session and the conferees adopted recommendations at the second session in November 1971. Many of these recommendations require periodic submittal of progress reports prior to the time of full implementation. In accordance with these recommendations, the Galveston Bay Technical Committee submits this progress report.

Recommendations Numbers 4, 5 and 11 concerned adequate criteria and sampling of shellfish harvesting areas to insure acceptability of the product for consumption. The Food and Drug Administration has initiated a nationwide sampling and analysis program to determine the toxicological significance of oil and hydrocarbon residues in oysters. Preliminary data from this survey are not yet available for general distribution. The Texas State Board of Health and the Food and Drug Administration have amended the sampling schedule in Galveston Bay to include, as far as possible, data collection under the most unfavorable hydrographic and pollution conditions. Alert levels proposed for heavy metal concentrations in shellfish at the Food and Drug Administration Seventh National Shellfish Sanitation Workshop were not adopted. These alert levels are included in this report as Table III-1 on page 18.

A committee has been formed to study the problem and review available data at yearly intervals.

T. P. Gallagher

Recommendation No. 6 concerned effective disinfection of municipal effluents and the centralization of sewage treatment plants. Grab samples of effluents from 50 major municipal waste plants collected by the Texas Water Quality Board in March 1972 indicated that a large number of the plants were meeting the Texas Water Quality Board chlorine residual requirements.

These results are shown in Table IV-1 on pages 21 and 22.

Total and fecal coliform concentrations in the effluents of many plants were still excessive. Total and fecal coliform are indicators of the possible presence of pathogenic organisms. In general, those plants with longer contact times discharged effluent with satisfactory bacteriological quality. The unsatisfactory bacteriological densities are related to either excessive solids concentrations in the effluent or short circuiting in the chlorine contact tank or both. Correction of the problem is being pursued on a case-by-case basis by the Texas Water Quality Board. The Sims Bayou plant of the city of Houston is the only major municipal waste source without chlorination facilities. These facilities will be constructed and in operation by December 1972.

The Texas Water Quality Board order requiring the installation of chlorination at Sims Bayou is shown as part of Attachment 1.

With respect to the centralization of sewage treatment plants and the elimination of small facilities, the Texas Water Quality Board has issued an order to the city of Houston requiring the abandonment of a number of obsolete plants and the diversion of these wastes to regional and subregional systems. The Clear Lake area has also received a Texas Water Quality Board order with the same objective.

These orders are included as Attachments 1 and 2 and the regionalization program for the Houston-Galveston Area Council is shown as Attachment 3.

Compliance with these Texas Water Quality Board orders is mandated before December 31, 1974.

Recommendation No. 7 called for a joint waste source survey of the Galveston Bay area by the Environmental Protection Agency and the Texas Water Quality Board, in addition to other ongoing studies. This survey commenced during April 1972.

T. P. Gallagher

It is presently anticipated that approximately one-half the waste effluent flow to the Houston Ship Channel will have been analyzed by October 1972. Results will be provided to the conferees as soon as they become available.

Recommendation No. 8 called for the requirement of best reasonable available treatment to minimize discharges of oil and grease. Texas Water Quality Board permits are being amended to require oil and grease concentrations in waste effluent to be not greater than 10 ppm.

Recommendation No. 9 called for a continuing reduction of waste loads and amendment of Texas Water Quality Board permits to reflect these reductions. Under present abatement schedules, the waste load to the Houston Ship Channel will be reduced to about 60,000 pounds per day of biochemical oxygen demand by December 1973 from the present 100,000 pounds per day. The major waste sources in the Texas City area will be reduced from the present 78,000 pounds per day to 13,800 pounds per day in 1974 to 11,800 pounds per day in 1976.

T. P. Gallagher

Recommendation No. 10 called for an evaluation of the organic sludge problem in the Houston Ship Channel with specific emphasis on the development of suitable dredged spoil disposal areas. Examination of bottom deposits by Texas A&M University showed highly organic material and represents an important pollutional source. Some analyses indicate that the channel deposits contain material toxic or inhibitory to microorganisms. EPA and the U. S. Army Corps of Engineers have proposed the construction of a ringed diked spoil disposal area on Atkinson Island. Further studies of the environmental impact of this proposal are advisable.

Recommendation No. 12 required an assessment of feasible processes to accomplish color removal from waste sources. The committee decided that although several ongoing research studies on color removal indicated promising results, the technology was still not sufficiently developed to require color removal processes be installed at the present time. The Texas Water Quality Board permits do specify that such processes will be installed when technological feasibility for general use is demonstrated.

Recommendation No. 13 states that: "To meet present official State-Federal water quality standards established for dissolved oxygen in the Houston Ship Channel, it is expected that the maximum waste load discharged from all sources will be about 35,000 pounds per day of 5-day BOD, including projected future development. The Texas Water Quality Board, in cooperation with technical personnel of the EPA, shall review existing waste discharge orders with the objective of allocating allowable 5-day BOD waste loads for sources discharging to the Houston Ship Channel such that the probable 35,000 pounds per day maximum shall not be exceeded." Such an allocation was made by the Technical Committee and presented in a public hearing by the Texas Water Quality Board in Baytown, Texas, in February 1972.

The notice of this hearing is included as Attachment 4 and the proposed allocations are shown in Table X-1 on pages 49 through 52.

Major opposition to these allocations was voiced at this hearing. The Texas Water Quality Board is conducting an abatement program that will attain a total BOD effluent level of approximately 60,000 pounds per day by December 1973. During this period, consultations will be held between the Texas Water Quality Board and the Environmental Protection Agency with individual waste dischargers to determine specific implementation dates by these waste sources for meeting Federal-State water quality standards for the Houston Ship Channel. The present program of limiting effluents to 60,000 pounds per day is an interim step and may not meet presently approved State-Federal water quality standards for dissolved oxygen in the Houston Ship Channel.

Recommendation No. 14 directs an allocation of allowable waste loads to Galveston Bay and all other tributary areas. The Clear Lake area has received a Texas Water Quality Board order requiring the abandonment of obsolete plants and the diversion of these wastes to regional and subregional systems. This is Attachment 2 in this report.

The major waste sources in the Texas City area will be reduced from the present 78,000 pounds per day to 13,800 pounds per day in 1974 to 11,800 pounds per day in 1976. The city of Galveston has been directed by a Texas Water Quality Board order to make extensive improvements in the collection system and to provide expanded treatment facilities by December 31, 1974.

This completes my presentation, Mr. Alexander.

MR. ALEXANDER: Thank you, Mr. Gallagher.

MR. STEIN: Are there any comments or questions?

MR. YANTIS: Not any questions of Mr. Gallagher. Just some brief general comments, if I may at this time, Mr. Chairman.

MR. STEIN: Certainly.

HUGH C. YANTIS, JR., EXECUTIVE DIRECTOR
TEXAS WATER QUALITY BOARD
AUSTIN, TEXAS

MR. YANTIS: In line with the policies long followed by the Chairman of the Water Quality Board, I would like to take note of the people on our staff who deal with the news. Miss Jean Ferris is sitting over here, and for the Federal Government Mr. Eddie Lee. I don't know whether there is anyone else with Eddie or not. He may have walked out.

I would like to note that the working press is here. Harold Scarlett is the only one that I know by name. I wonder if the other two would stand up and tell what news media they do represent.

MISS DIAL: My name is Mauri Dial. I am with KTRH Radio here in Houston.

MR. ROYAL: Ben Royal with the Texas City Daily Sun.

MR. YANTIS: Thank you.

In another sense, always to know with whom we are communicating, there are a great many people here from the State staff. I would like for each one of you to stand up briefly just so we can kind of get a head count from the Texas Water Quality Board staff.

(A number of people stood up.)

MR. STEIN: They had better not have a vote here. (Laughter)

MR. YANTIS: Now, how many people are here from the Federal staff? If you would, please.

(A number of people stood up.)

MR. YANTIS: Now, I see a sprinkling of people who represent industry. I would like for each one of you to stand if you are a direct industrial representative of any kind.

(A number of people stood up.)

MR. YANTIS: Now, I see several people from local governments, at least I think they are. Are there any people from the local governmental subdivisions of the State present?

(A number of people stood up.)

MR. YANTIS: I was going to introduce Joe separately. (Laughter)

I would especially like to take note that the State Health Department has one or more representatives back there. Would you please stand.

(A number of people stood up.)

MR. YANTIS: The State Health Department would have had more representatives present except for the failure of a letter to be delivered that asked them to be present, but since they are very deeply involved in shellfish sanitation they have had a very major part, not only historically but throughout this conference, in all matters relating to the conference and especially the shellfish, and I am sorry that they did not have more time to have fuller representation.

Somewhere back in either the Bible or Shakespeare or someplace like that there is an old proverb that goes, approximately: The old order changeth and giveth way to the new. Mr. Joe Teller, who just stood up back there, was the

Deputy for the Texas Water Quality Board when these conferences began and under his direction practically all of the State's presentation was developed. I would like for Joe to stand up and be recognized historically as the person who helped put all this together. (Applause)

(Mr. Teller stood up.)

MR. YANTIS: And now he has gone from the frying pan into the fire, working with the local governmental unit out where people can really shoot at you.

I noted with some amusement, I guess I would say--you know, things are funny always when they happen to somebody else--the State and the Federal Government, and this conference especially, have encouraged the elimination of small sewage treatment plants in favor of larger systems and regional systems, but let me suggest when you try to eliminate one that the owner doesn't want to eliminate you can have some real conversations take place (laughter), and I think that Mr. Scarlett has been aware of some of these. He has taken note of them in the paper.

I suppose the most important thing that I would say, when I came into the room I noted the Christmas tree down here at the end of the row of tables. While technically Christmas comes once a year, I think that the spirit of it ought to come all year long and especially I think the spirit of it should be the spirit in which a conference of this nature and the work growing out of the conference will be conducted. To do it any other way is simply the wrong way.

I also remark,noting Mr. Stein's comments, there has been a new Federal law. It is very detailed and very different from anything that we have ever had. It does say in the very beginning that water pollution control is a State responsibility and shall be done by the States. At the same time the amount of money available to the States under this law is, for Texas, about half of what we have had in the past and this is a severe handicap to the Texas program. But nearly everything that is to be done coming out of the shellfish conference, the techniques, the procedures, are also required under the new Federal law.

I really see no advantage to trying to ride two horses at once, because there is a certain amount of red tape, and the new law says, which is very down-to-earth language, that they want to eliminate paper work. That is right in the law. I have heard the Congressman who wrote it say we want to cut red tape.

And, Mr. Alexander, some of the tape I wish you would cut has to do with the Public Law 660 grants for the city of

Houston which have been promised to them for, lo, these many months and which are in the state of promised but not in cash.

MR. ALEXANDER: I think we will have a report on that this morning, Mr. Yantis, that will make you very happy.

MR. YANTIS: I trust that they will make the Mayor even happier than they have made me.

But in the sense that there is a certain amount of staff time, administrative thought and detail that goes into carrying forward the work coming out of the shellfish conference, since the same work would be developed under the new Federal law in the ordinary procedures that we are following and would be following, it seems to me that we could simplify things a great deal by simply going at the close of this conference under the Federal law and have this meeting today be the last meeting of the shellfish conference, since it would not seem, in view of this fact situation, to be productive beyond this point as a vehicle in which to work.

So I would like to suggest to the Chairman of this meeting that we keep in mind the fact that we may have used this vehicle well and to the fullest, but now there is another more convenient vehicle under which it might be best that we work.

Thank you, Murray, for the opportunity to speak.

I did forget one thing. Except for Al Greene, whom I know by sight, how many of you are here who simply represent the general public and have no direct connection with industry or government otherwise?

(Two or three ladies stood up.)

MR. YANTIS: Thank you very much.

MR. STEIN: That shows you why we have pollution control the way we do.

MR. YANTIS: Mr. Stein, if the ladies are like my wife, it doesn't take very many of them to make a majority.

MR. STEIN: I know that, but they have got to stay here all the time and they are here on their own time and own money, while the rest of us are getting paid to sit here. We usually can outwait them.

MR. YANTIS: Thank you for the opportunity to make these comments. The major portion of the presentation for the State will be made under the direction of Dick Whittington, who is now Deputy, the position which Joe Teller did hold, and unless it is appropriate later on in the meeting I would have no more personal comments.

MR. STEIN: Thank you. We welcome your comments at any time, Mr. Yantis.

I would like to join with Mr. Yantis in endorsing the spirit of Christmas for all of us here. However, I would hope that the one aspect of Christmas doesn't take over as it usually does, whenever they invoke the spirit of Christmas and the Feds are around, immediately they concentrate on us being Santa Claus. (Laughter)

MR. YANTIS: Well, Mr. Claus, it was awfully good for you to be here anyhow. (Laughter)

MR. STEIN: I have two comments or questions for Mr. Gallagher and the rest.

One, and I was out of the country for the past couple of weeks, but I did, even where I was, read a newspaper report on color removal in the paper industry from Georgia Pacific up in Maine, in the St. Croix River, indicating that by using their line recovery process they were going to be successful in removing color.

Now, I wonder, Mr. Gallagher, I recognize the recommendations made on color being held off until something develops, but I wonder, in view of that Georgia Pacific announcement and the wide publicity it received, whether possibly another look at what they are doing up there might be in order or whether someone has looked at that.

MR. GALLAGHER: Not at that particular one, Mr. Stein. It was too recent to report on at this session.

But I think that your overall thrust is correct that the technology for color removal is just about at the threshhold of being incorporated, I would say, now as generally demonstrable treatment for color.

MR. STEIN: Again, you know, I have tremendous respect for Georgia Pacific because we have had a lot of dealings with them, but their announcement was that they are going to patent this and make this available internationally to people who want color removal, and I would think that the claim should be looked at rather closely because they are not given to making claims idly or lightly. If they say that they are removing color, I think that probably would be something that we should look at very, very carefully, and if it can be applied to the paper companies in the Houston Ship Channel in line with the recommendations, I suggest that it be given full consideration and evaluation.

MR. GALLAGHER: We will be pleased to do that.

MR. YANTIS: I think it is very appropriate, Mr. Stein, to look at new developments always and also they should be used where they can be in the context of the ongoing economy.

MR. STEIN: Right.

MR. YANTIS: The last figures that I saw that analyzed the cost of color removal indicated that the cost of color removal was approximately equal to the profit in making the paper. At that point, I mean our desire may be to remove color, it simply is not feasible in the competitive paper market so there has to be an additional step some place that lets the color removal be taken out in competition with other paper mills that may not be in the United States and in the face of the overall economic situation. There is a real problem in how much you can do and stay alive.

MR. STEIN: Oh, that is true. That is the reason I always like to give credit to the ones we give and that is why I mentioned Georgia Pacific. They have very admirable characteristics as a corporation and one of their most admirable characteristics is having a penchant for not running a plant where they can't make a profit. If they claim that they are removing the color and it is successful, I am sure that that is not eating up the profits in their plants. Otherwise they wouldn't be putting this forward.

And I would be willing to bet my bottom dollar that that is the essential part of the credo of Georgia Pacific in presenting a process of pollution abatement, that it is economically feasible.

MR. YANTIS: Well, I certainly support your remarks about looking into it and if it is feasible I certainly expect it to be required in this area.

MR. STEIN: The rest of what I have to say is a comment, because I think this will lead to the statement that you made before about the recommendation for the conclusion of the conference. I don't think we are proceeding in the conference any more.

But we have a problem that I think has been pointed out by Mr. Gallagher in his report. To take one item, if what he states is correct and we are thinking in terms of limiting discharge of BOD to 35,000 pounds in the aggregate in the Houston Ship Channel, and the State of Texas has a program to get down to 60,000 pounds by December 1973--I am making no judgment on the reasonableness or unreasonableness of that program--the entire question of the issuance of permits or, indeed, the question of the Federal Government turning over to the State the authority to issue the permits, will relate to coming to some kind of agreement among the Federal Government, the State and others to reach an equitable approach to these matters.

I think we are going to face that in various areas of the country, and the Houston Ship Channel is a prime example of relatively slack water, a big city, and a lot of industries discharging into a limited watercourse, when the permit requirements may be for the individual, possibly, a little more stringent than what we consider Class A requirements if the plant were located somewhere else. This may be the cost of doing business in an area like this.

I am not sure that we will be able to resolve that kind of thing without meetings of this kind. They won't be done under the conference technique, but I would suspect that we would have to give the industries, local government, the States and us an opportunity to get this worked out; and I think this will probably be more fruitful in the end than either a turning over of the delegation or authorization of the program to the State or a denial of a permit to any city or industry. That is not the object. I think we all recognize we have a very difficult technical problem to meet the objectives if the 35,000 is going to be valid at all, and the only way that that can give is by continuous discussion until we have resolved all the issues here. I am not sure we have done that yet.

MR. YANTIS: Well, this is true. But I would expect that that type of continuing conversation, which actually is going on now, would be between the staff of the Texas Water Quality Board and the staff of the Dallas EPA office. That is a perfectly ordinary part of the Dallas office work in administering the proposed Federal permit system in its own region and we have those meetings now.

As a matter of fact, to some degree--and Mr. Whittington, I am sure, could talk to this more than I or maybe some of the others--EPA-Dallas already has drafted out, and I would say these are working inhouse drafts, not for publication, various drafts of what we think might well be required for the various industries throughout the State. We haven't come to any necessary full agreement on all of them as yet. We are talking about them.

But the only suggestion that I have here is that the conferences you mentioned are necessary, they do exist and will continue to exist, but under the Federal law I think they would be an absolutely ordinary part of the regional-State relationship rather than a special relationship between the State and the Washington office.

MR. STEIN: Oh, I think you are probably right. But I think this is a matter of internal organization. I was more interested in the other aspect of this. Since these decisions are so important, I am not quite sure we should do this by technical staff meetings only, but we really should give the public from time to time a peek at what we are doing--

MR. YANTIS: Mr.--

MR. STEIN: --before we come up with the final conclusion--

MR. YANTIS: Mr. Stein--

MR. STEIN: --and let the industries and the citizens groups and the local governments participate.

MR. YANTIS: This is one of the points where I think the State is and has always been ahead of the Federal Government. I could list quite a number of other things too, but that would be a whole other meeting. (Laughter)

The original recommendation was modified to read as it now does to point up that so far as the participation of the State agency is concerned, we participate under State law, and quite desirably, a State law which requires that every permit to be amended have a public hearing, full and absolute disclosure, notice in the newspaper and by mail to a great list of people. Every action that we take is taken in public, following public hearings, and likewise all of the decisions about the Houston Ship Channel and more especially those about the individual waste dischargers are made in public. And I would hasten to make sure you realize that only about half of them are industry, the other half are just people, cities, primarily

Houston but others, and we not only set forth our views and comments and knowledge in public hearings but anyone else can. And what is equally important, the person making the discharge has an absolute right in public to say his part, and it is important that the person who makes a discharge also be fully heard and be heard in public.

So I would say that under State law even far more than under Federal law there will be public hearings at every step and we could not and would not proceed in any other fashion.

Which, of course, is one reason that I was introducing the press. As the Chairman of our agency always says, they are the principal ways by which hearings and the work of the agency are made known to the public. More people read papers than go to public hearings, I can assure you.

MR. STEIN: I would hope so. (Laughter)

MR. YANTIS: Oh, I don't know about that.

MR. STEIN: But I am glad we are in complete agreement on that, and we are all in agreement, I guess, that we should do this in the most public manner. The only thing that I can tell you is you would like to go public but go public with our regional office and not the Washington office of EPA. I have never made that distinction. I always thought we were one government.

But I can appreciate your view.

MR. ALEXANDER: Mr. Stein, if it is all right with you, I feel like we are sort of left in the middle here. Mr. Whittington has the last half of the report on this technical committee to tell us what has happened from April up until now. So if it is all right with you I would like to call on Mr. Whittington, whom Mr. Yantis has just introduced as the Deputy Director of the Texas Water Quality Board and a member of this technical committee.

Mr. Whittington.

DICK WHITTINGTON, DEPUTY DIRECTOR

TEXAS WATER QUALITY BOARD

AUSTIN, TEXAS

MR. WHITTINGTON: Thank you, Mr. Alexander.

One result of the Galveston Bay Enforcement Conference was the formation of the Galveston Bay Technical Committee, a committee which Mr. Gallagher has already pointed out is composed of personnel from the staffs of the Texas Water Quality Board and the EPA. This committee has prepared a formal report of the progress being made in water quality management in the Galveston Bay area pursuant to the recommendations of the conferees and it has been presented to this public meeting. That is the red book. In addition to this formal report, it was felt that an informal presentation relative to the progress being made in reducing pollutant loads and improving the water quality of the Galveston Bay complex would be relevant and timely. This is such a report.

Three geographic areas account for the majority of waste loads discharged into the Galveston Bay complex. These are the Houston Ship Channel, the Texas City area, and Galveston Island. These areas will be discussed separately.

Galveston Island is the first.

The largest waste discharger on Galveston Island is the city of Galveston. The city is committed to a number of improvements to its sewerage system, including modifications and expansion of the main sewage treatment plant. When these modifications are complete, the BOD contribution to the bay from this plant is expected to be reduced from a 1972 average so far of about 4,000 lbs/day to about 1,100 lbs/day. This represents a BOD reduction of 72 percent. The contract for the construction of these facilities was executed in October 1972 and completion is scheduled to be in 1973.

The second of these three areas is the Texas City area.

D. Whittington

In January 1972 the BOD load emanating from the Texas City area amounted in the aggregate to approximately 95,000 lbs/day of BOD. This is somewhat different from the one in the report that Mr. Gallagher presented inasmuch as this number does include municipal contributions, whereas the report of the technical committee in the red book does not. This load has been reduced to approximately 82,000 lbs/day by the installation of waste treatment facilities by the Monsanto Company.

This is shown on the slide on the screen. Also, for those of you who cannot see the screen, it is page 3 of the little handout.

It is anticipated that the waste treatment facilities presently under construction by the Gulf Coast Waste Disposal Authority and scheduled for completion in 1973 will lower the aggregate Texas City area daily BOD load to about 50,000 lbs/day, a decrease of approximately 30,000 lbs/day. A waste control order issued by the Texas Water Quality Board on November 29, 1972, requires the American Oil Company to construct waste treatment facilities to be completed in mid-1974 which will lower the aggregate Texas City area load to approximately 40,000 lbs/day. Further scheduled waste treatment facilities are expected to lower the aggregate BOD load to about 10,000 lbs/day by 1975. This is a 90 percent reduction from the BOD load of 95,000 lbs/day in early 1972.

The third of the areas which I wish to discuss is the Houston Ship Channel.

As reported at the original meeting of the shellfish enforcement conference in June 1971, the BOD load imposed on the Houston Ship Channel at that time was approximately 130,000 lbs/day. The load had been decreased to that value from the 1968 load of 430,000 lbs/day, a reduction of about 70 percent. In September 1972 the aggregate BOD load on the Houston Ship Channel was 117,000 lbs/day.

I' was anticipated that the startup of the expanded city of Houston Northside Plant would result in a further decrease in the BOD load. This happened, I think, in December of 1971. Contrary to expectations, when this plant was placed into operation, difficulties encountered with the sludge handling facilities, compounded by the increased biological sludges generated, resulted in a BOD load increase from this facility. Additional sludge handling facilities, expected to correct this problem, are under construction. They are scheduled for completion in March 1973. Should these facilities perform as expected, the aggregate BOD load on the Houston Ship Channel should be decreased to approximately 70,000 lbs/day in early

1973. Further waste treatment improvements presently under construction by Rohm & Haas, Ethyl Corporation, and others, should decrease the aggregate BOD load to approximately 60,000 lbs/day during 1973. These improvements should result in a 50 percent reduction in the 1971 BOD loads. These are the changes which have been made in the waste loads.

I would like to now discuss with you briefly the response of the Galveston Bay complex system to these changes in waste loads, specifically the Houston Ship Channel.

At the outset, the water quality in the Houston Ship Channel remains unsatisfactory. Nevertheless, improvements are becoming apparent.

Figure 2, which is page 5 of the handout, also shown on the screen, shows the average BOD concentration at various locations along the Houston Ship Channel. BOD concentrations, represented by the solid bars, are averages from the Galveston Bay water quality survey conducted by the Texas State Department of Health for the period 1963 through 1967. The patterned bars represent 1971-1972 Texas Water Quality Board stream monitoring data. This figure indicates that the BOD concentrations at all stations along the channel except Morgan's Point during the period 1971-1972 are approximately one-half those measured in 1963-1967. The Morgan's Point sampling station is influenced more heavily than the others by the better quality bay water and it shows no particular trend one way or the other.

We considered that this graph represents positive proof that an improvement in the quality of the water of the Houston Ship Channel has occurred over the past 5 years.

I would like to go on with this discussion and discuss with you dissolved oxygen.

At the original meeting of the enforcement conference held in Houston in June 1971 the Texas Water Quality Board reported that the dissolved oxygen concentration at Morgan's Point appeared to be responding to the decreasing waste loads being imposed upon the channel, but that there had been no significant response at that time in the upper reaches of the channel. It was indicated, however, that a response was anticipated. We are encouraged to note that this response has become manifest.

I would direct your attention to the slide on the screen. This particular slide is also shown on page 6 of the handout.

This graph portrays the dissolved oxygen profile for the Houston Ship Channel from Morgan's Point to the Turning Basin at various periods of time. It will be noted that the average dissolved oxygen has steadily improved over the years.

D. Whittington

The lower line shows the dissolved oxygen concentrations which existed in the lower channel during the period July through December of 1955. These data are included in an article entitled "An Ecological Survey of the Houston Ship Channel and Adjacent Bays" published in the Publications of the Institute of Marine Science.

The next line up portrays the dissolved oxygen profile which existed in the channel during the period July through December of 1968. These data were collected by the Texas A&M University and are available from the Environmental Engineering Division.

You will note that the dissolved oxygen improved over the 1955 values.

The next line up portrays the dissolved oxygen profile which existed in the channel during 1971. These data were also collected by Texas A&M University.

The top line represents the dissolved oxygen profile which existed in the channel during the period January through September 1972. These data were collected by the Texas Water Quality Board District 7 office and are available from the Texas Water Quality Board.

It will be noted that a substantial improvement in the dissolved oxygen profile occurred during 1972. We would hasten to point out that even with this improvement the dissolved oxygen concentration is from time to time zero in the upper reaches of the channel and we do not consider the channel to be in acceptable condition. Further improvements are needed and will be made.

Now I would like to show you a slide which is not in the handout but which I think is significant. This particular slide was constructed from data collected by Texas A&M University and it shows the miles of the Houston Ship Channel which have been brought into compliance with the 2 mg/l oxygen requirements since 1969 broken into two forces of summer months and winter months.

You note in 1970 there was just a very, very slight improvement in the summer months, maybe 0.2 of a mile or something of the sort. In 1971 it was about 4.5 miles and in 1972 about 5.5 miles. Those mileages would be measured from the 1969 values.

The winter months show somewhat the same picture, with a few larger numbers than you would expect because of the cooler temperatures.

Now, there is a little peculiarity in these data in the sense that the summer months for 1971 show a better situation than the winter months, and I have no explanation for

D. Whittington

this. But I do think that this slide does represent a positive improvement in the dissolved oxygen situation in the Houston Ship Channel.

Next I would like to discuss with you bacteriological quality.

Bacteriological quality again, as indicated with dissolved oxygen, is still unsatisfactory. This is largely due to the lack of chlorination at the city of Houston's Sims Bayou plant. Chlorination facilities are under construction and completion is expected by March 1, 1973. The city did have a construction accident which delayed the completion of these facilities by 3 months. They were originally scheduled, as you will recall, for completion in December of this year.

Nevertheless, with respect to bacteriological quality, some progress has been made in improving the quality in the lower reaches of the Houston Ship Channel. For example, at the San Jacinto Monument, the geometric mean of the coliform most probable number data show an MPN of 2,044 for the 1972 data.

This graph is reproduced on page 7 of your handout.

This is contrasted to the geometric mean of 25,000 for the period 1963 through 1967, inclusive. It will be noted that the 1972 value is only 8 percent of the 1963-1967 value.

Similar data for Morgan's Point shows an MPN reduction from 500 to 80. This is shown on page 8 of the handout.

With respect to biological quality, commencing in February of 1972 the District 7 office of the Texas Water Quality Board commenced a biological monitoring program of the Houston Ship Channel. This program was commenced on October 19, 1971, following the appearance of shrimp, crabs and fin fish in the channel approximately 2 miles upstream from the San Jacinto Monument. This was the first occurrence of this type of aquatic life at this point in the channel for many years. Since that time, fin fish, shrimp, and crabs have been present in the water at this location on every occasion that the district office has sampled.

During the 1972 regular sampling runs made under this program until November, no fin fish, crabs, or shrimp have been recovered at the sample station located 11 miles upstream from the San Jacinto Monument. On the most recent sampling run, November 28, 1972, the best water quality conditions to date were measured and marine fin fish and crabs were recovered at this station. To our knowledge, this is the farthest point upstream that this type of aquatic life has been noted in recent years. These migrations are indicative of a general improvement of water quality in the Houston Ship Channel.

In addition to shrimp, crabs and fin fish, the District 7 office has sampled plankton populations at five stations on the Houston Ship Channel in February, March, May, June, August, and September 1972. The species diversities of the plankton population at the various stations are shown in Figure 6. This is page 10 of your handout. It will be noted that species diversity increased from 0.4 at the Turning Basin to 1.4 at Morgan's Point. A species diversity of around 2.0 is generally indicative of unpolluted or natural conditions. These data indicate that the biological conditions of the upper portion of the Houston Ship Channel are generally poor. However, the areas around the monument and Morgan's Point have shown a marked increase in both number of species and total individuals.

Based on physiochemical, bacteriological, and biological data, it has been demonstrated by the foregoing discussion that the water quality in the Houston Ship Channel has been improved by the pollution abatement efforts made. Even though progress has been made, additional improvement is required and will be forthcoming.

The next thing that I would like to discuss is the joint Texas Water Quality Board-EPA waste source survey.

Recommendation No. 7 of the Galveston Bay Enforcement

Conference dictates that the Texas Water Quality Board and the Environmental Protection Agency cooperate in an intensive waste source survey of the waste dischargers to the Galveston Bay complex for the purpose of determining for the various waste dischargers the implementation schedules for meeting Federal-State water quality standards. This joint effort commenced in April 1972 and has progressed in a satisfactory manner.

A complete field survey consists of a preliminary conference followed by a 3-day composite sampling program. The preliminary conference is held with a company's technical representatives to orient the sampling team and to gather background data. After a thorough evaluation of the background data, the sample team selects appropriate sampling points and returns to the plant site for the intensive sampling effort.

When analytical data from the sampling program is available, a draft of a final report is made. These drafts are jointly prepared by the Texas Water Quality Board and the Environmental Protection Agency field offices. After review by the joint Texas Water Quality Board-EPA technical committee, the report is finalized and discussions are held with the discharging industry or municipality relative to the findings and recommendations of the final report.

The effort to date has been directed to industries and municipalities discharging into the Houston Ship Channel. As of October 1, 1972, a total of 19 preliminary conferences with industries and municipalities have been held. Fourteen waste sources have been sampled and two final reports have been completed. The waste sources already surveyed represent approximately 83 percent of the BOD load on the Houston Ship Channel.

In the interest of reviewing the major waste dischargers first, the intensive waste source survey effort is now being directed to the Texas City area. Preliminary conferences have already been held with the major industries in the Texas City area and sampling is scheduled to commence in December. It is anticipated that the sampling work in the Texas City area will be concluded sometime in January 1973.

With the advent of the 1972 amendments to the Federal Water Pollution Control Act, the National Pollutant Discharge Elimination System was inaugurated. This system is to be administered by the Environmental Protection Agency. Provisions are made in the Act for the administration of this program to be transferred to the States if the State program conforms to the provisions of the Act and guidelines to be promulgated by the Administrator of EPA. The Act envisions the

EPA providing continued supervision of the program. The status of the transfer of this program to the State of Texas is as yet unresolved. And Mr. Yantis and Mr. Stein discussed this previously.

Now, regardless of who actually issues the permits regulating the various waste dischargers to the Galveston Bay complex, it is expected that the intensive waste source survey findings will be utilized in the continuing effort of deriving appropriate effluent limitations and implementation schedules.

In summary, Mr. Chairman, programs presently under way are expected to reduce the pollutant load from Galveston Island 72 percent during 1973, from the Texas City area 90 percent by the end of 1975, and from the Houston Ship Channel 50 percent by the end of 1973. It is recognized that this reduction may not be adequate, and joint efforts by the Texas Water Quality Board and the EPA are continuing which will result in continued reductions.

We are encouraged to note that the water quality in the Houston Ship Channel continues to improve. Improvements have been noted in physiochemical measurements, bacteriological measurements, and most significantly by the migration of marine fin fish, crabs and shrimp into areas of the channel where they have not been seen for many years.

Mr. Chairman, that concludes my report.

MR. STEIN: Mr. Whittington, would you like this whole report, including the charts, to be included into the record as if read?

MR. WHITTINGTON: Yes, sir, I would.

MR. STEIN: Without objection, that will be done.

(The above-mentioned report follows:)

Water Quality Report
Galveston Bay Complex
State of Texas

Prepared for

Public Meeting, Galveston Bay Enforcement Conference
Houston, Texas
December 5, 1972

by

Texas Water Quality Board

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WATER QUALITY REPORT
GALVESTON BAY COMPLEX
STATE OF TEXAS

I. INTRODUCTION

One result of the Galveston Bay Enforcement Conference was the formation of the Galveston Bay Technical Committee - a committee composed of personnel from the staffs of the Texas Water Quality Board and the EPA. This committee has prepared a formal report of the progress being made in Water Quality Management in the Galveston Bay area pursuant to the recommendation of the conferees and it has been presented to this public meeting. In addition to this formal report, it was felt that an informal presentation relative to the progress being made in reducing pollutant loads and in improving the water quality of the Galveston Bay complex would be relevant and timely. This is such a report.

II. CHANGES IN POLLUTION LOADS

Three geographic areas account for the majority of waste loads discharged into the Galveston Bay complex; these are the Houston Ship Channel, the Texas City area, and Galveston Island. They will be discussed separately.

A. Galveston Island. The largest waste discharger on Galveston Island is the City of Galveston. The City is committed to a number of improvements to its sewerage system, including modifications and expansion of the Main Plant. When these modifications are complete, the BOD contribution to the Bay from this plant is expected to be reduced from a 1972 average of about 4,000 pounds/day to about 1,100 pounds/day. This represents a BOD reduction of 72%. The contract for the construction of these facilities was executed in October 1972, with completion scheduled in 1973.

B. Texas City Area. In January 1972, the BOD load emanating from the Texas City area amounted in the aggregate to approximately 95,000 pounds/day of BOD. This load has been reduced to approximately 82,000 pounds/day by the installation of waste treatment facilities by the Monsanto Company.

It is anticipated that the waste treatment facilities presently under construction by the Gulf Coast Waste Disposal Authority and scheduled for completion in 1973 will lower the aggregate

Texas City area daily BOD load to about 50,000 pounds, a decrease of approximately 30,000 lbs/day. A waste control order issued by the Texas Water Quality Board on November 29, 1972, requires the American Oil Company to construct waste treatment facilities to be completed in mid-1974 which will lower the aggregate Texas City area load to approximately 40,000 lbs/day. Further scheduled waste treatment facilities are expected to lower the aggregate BOD load to about 10,000 pounds per day by 1975. This is a 90% reduction from the BOD load of 95,000 pounds/day in early 1972 (see Figure 1).

C. Houston Ship Channel. As reported at the original meeting of the Shellfish Enforcement Conference in June 1971, the BOD load imposed on the Houston Ship Channel at that time was approximately 130,000 pounds/day. The load had been decreased to that value from the 1968 load of 430,000 pounds/day, a reduction of about 70%. In September 1972, the aggregate BOD load on the Houston Ship Channel was 117,000 pounds/day.

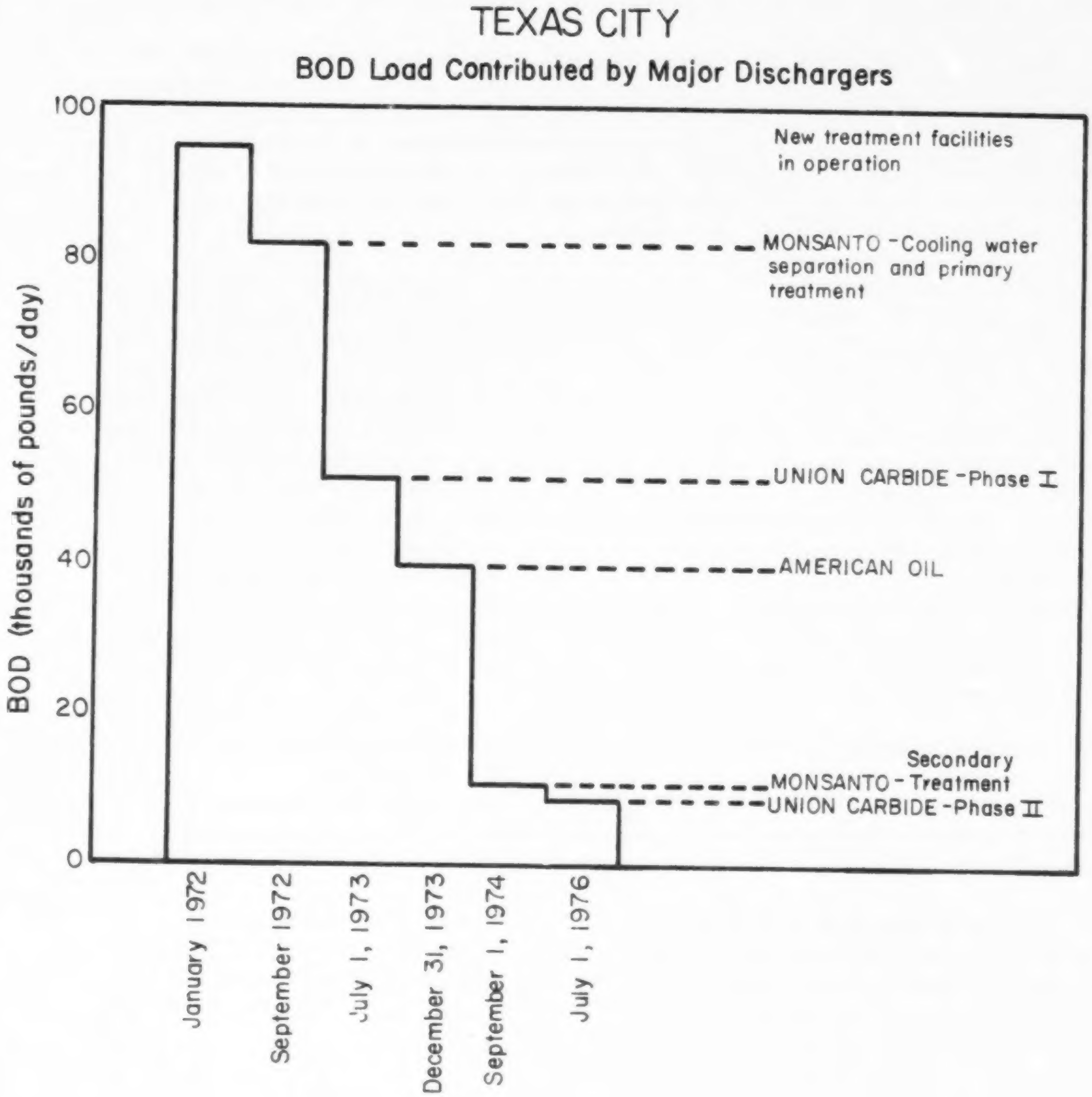
It was anticipated that the startup of the expanded City of Houston Northside Plant would result in a further decrease in the BOD load. Contrary to expectations, when this plant was placed into operation, difficulties encountered with the sludge handling facilities, compounded by the increased biological sludges generated, resulted in a BOD load increase from this facility. Additional sludge handling facilities, expected to correct the problem, are under construction. They are scheduled for completion in March 1973. Should these facilities perform as expected, the aggregate BOD load on the Houston Ship Channel should be decreased to approximately 70,000 pounds/day in early 1973. Further waste treatment improvements presently under construction by Rohm & Haas, Ethyl Corporation, and others, should decrease the aggregate BOD load to approximately 60,000 pounds/day during 1973. These improvements should result in a 50% reduction in the 1971 BOD loads.

III. IMPROVEMENTS IN THE HOUSTON SHIP CHANNEL WATER QUALITY

At the outset, the water quality in the Houston Ship Channel remains unsatisfactory. Nevertheless, improvements are becoming apparent.

A. Biochemical Oxygen Demand. Figure 1 shows the average BOD concentrations at various locations along the Houston Ship Channel. The BOD concentration represented by the solid bars are averages

FIGURE I


TEXAS CITY
BOD Load Contributed by Major Dischargers
BOD (thousands of pounds/day)
100
80
60
40
20
0
New treatment facilities in operation
MONSANTO - Cooling water separation and primary treatment
UNION CARBIDE - Phase I
AMERICAN OIL
Secondary
MONSANTO - Treatment
UNION CARBIDE - Phase II
January 1972
September 1972
July 1, 1973
December 31, 1973
September 1, 1974
July 1, 1976

from the Galveston Bay Water Quality Survey for the period 1963-1967.(1) The patterned bars represent 1971-1972 Texas Water Quality Board stream monitoring data.(2) This figure indicates that the BOD concentrations at all stations along the Channel except Morgan's Point during the period 1971-1972 are approximately one half those measured from 1963-1967. The Morgan's Point sampling station is influenced more heavily than the others by the better quality bay water. Figure 2 is positive proof of an improvement over the past five years in the quality of water in the Houston Ship Channel.

B. Dissolved Oxygen. At the original meeting of the Enforcement Conference held in Houston in June 1971, the Texas Water Quality Board reported that the dissolved oxygen concentration at Morgan's Point appeared to be responding to the decreasing waste loads being imposed upon the Channel, but that there had been no significant response at that time in the upper reaches of the Channel. It was indicated, however, that a response was anticipated. It was encouraging to note that this response has become manifest.

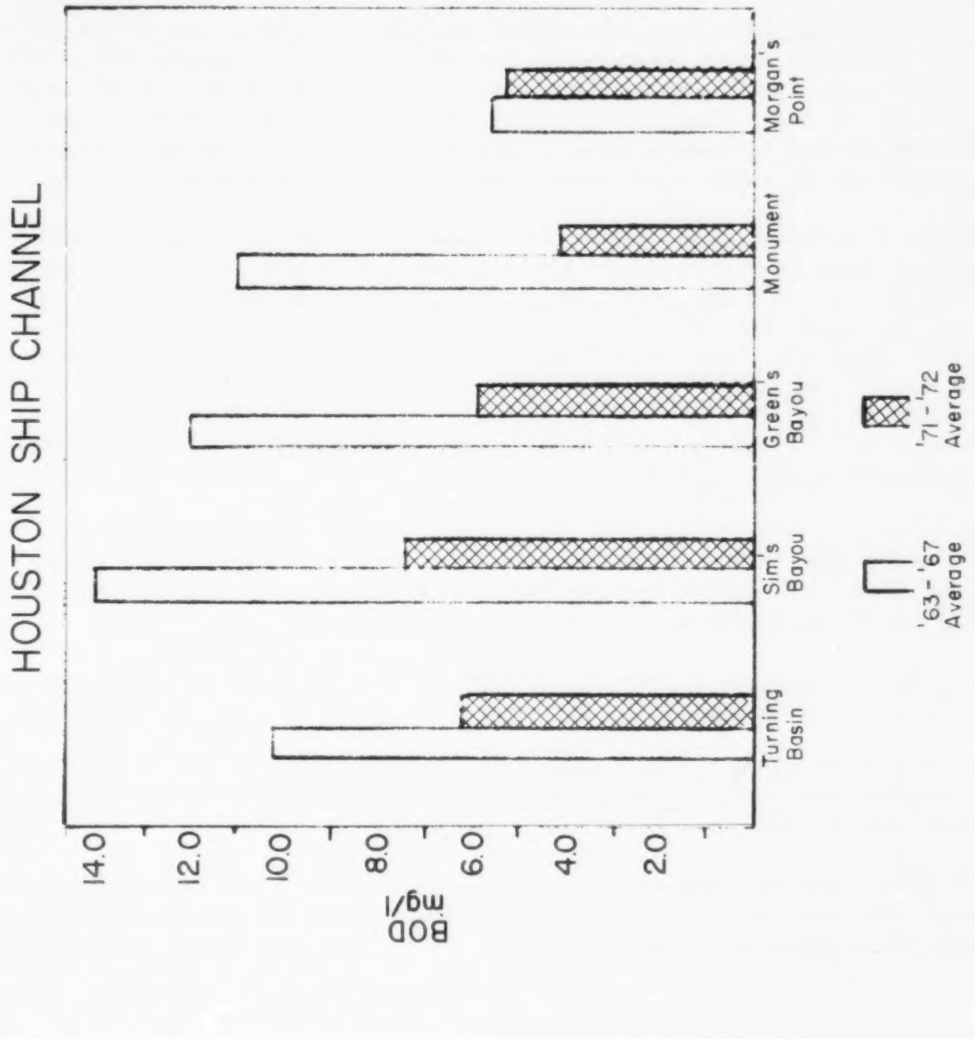
Figure 3 portrays the dissolved oxygen profile for the Houston Ship Channel from Morgan's Point to the turning basin at various periods of time. It will be noted that the average dissolved oxygen has steadily improved over the years. The lower line shows the dissolved oxygen concentrations which existed in the lower Channel during the period July through December of 1955. These data are included in an article entitled "An Ecological Survey of the Houston Ship Channel and Adjacent Bays" published in the Publications of the Institute of Marine Science.(3)

The green line portrays the dissolved oxygen profile which existed in the Channel during the period July through December of 1968. These data were collected by Texas A&M University and are available from the Environmental Engineering Division.(4)

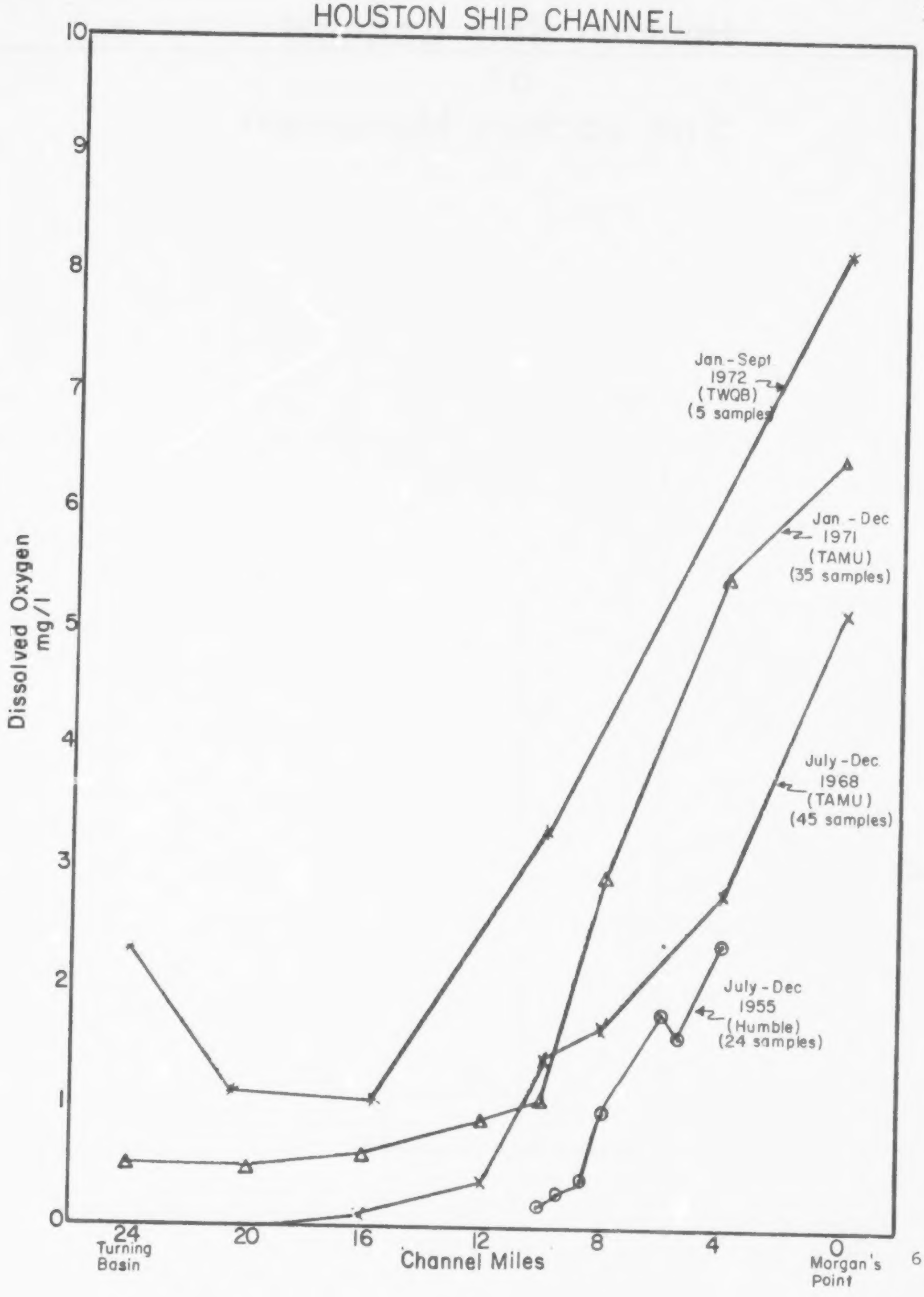
It will be noted that the dissolved oxygen concentrations in the Channel increased slightly between 1955 and 1968.

The red line portrays the dissolved oxygen profile which existed in the Channel during 1971. These data were also collected by Texas A&M University.(4)

The blue line represents the dissolved oxygen profile which existed in the Channel during the period January through September 1972. These data were collected by Texas Water Quality Board District 7

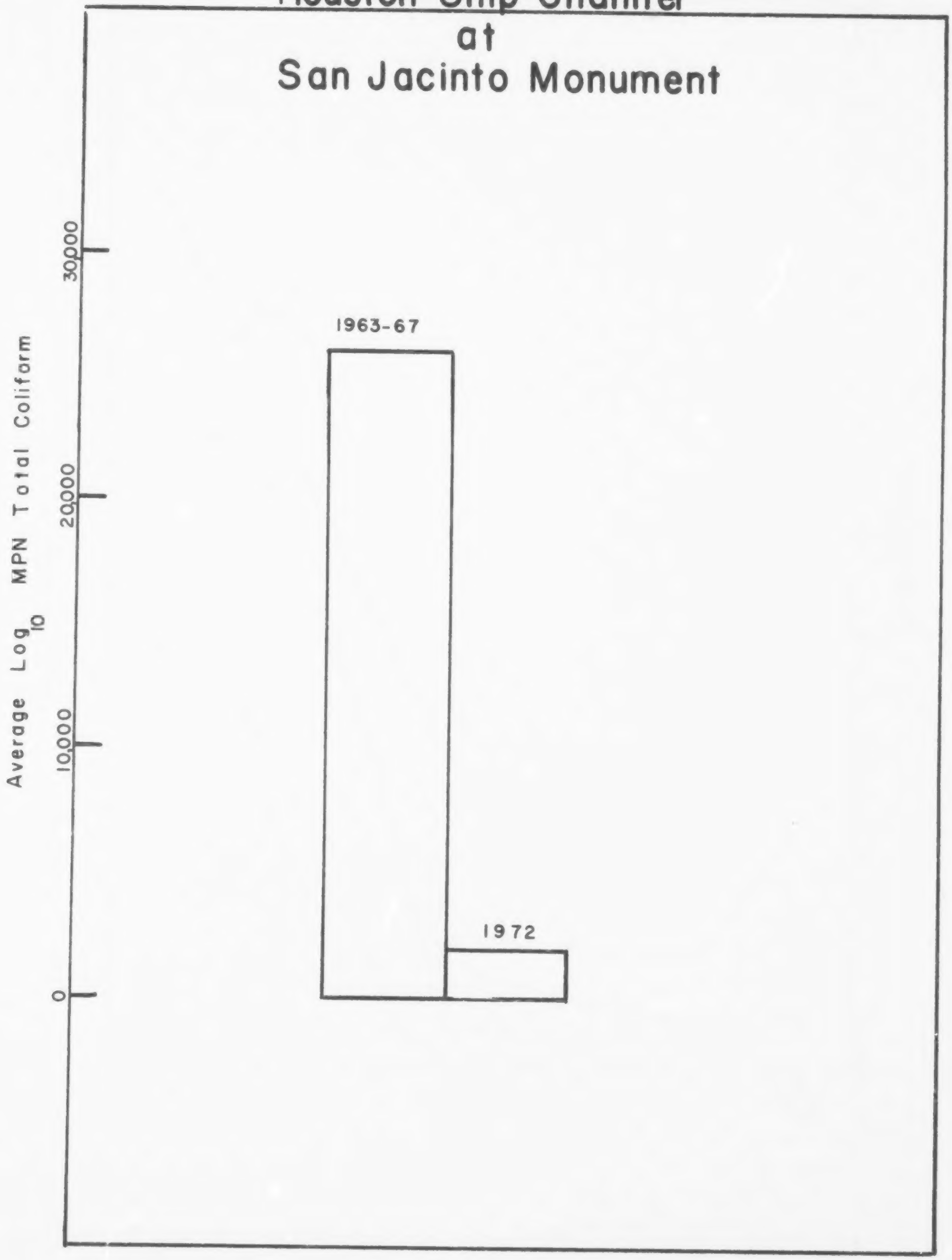

HOUSTON SHIP CHANNEL
BOD
mg/l
14.0
12.0
10.0
8.0
6.0
4.0
2.0
Turning Basin
Sims Bayou
Green's Bayou
Monument
Morgan's Point
'63 - '67 Average
'71 - '72 Average

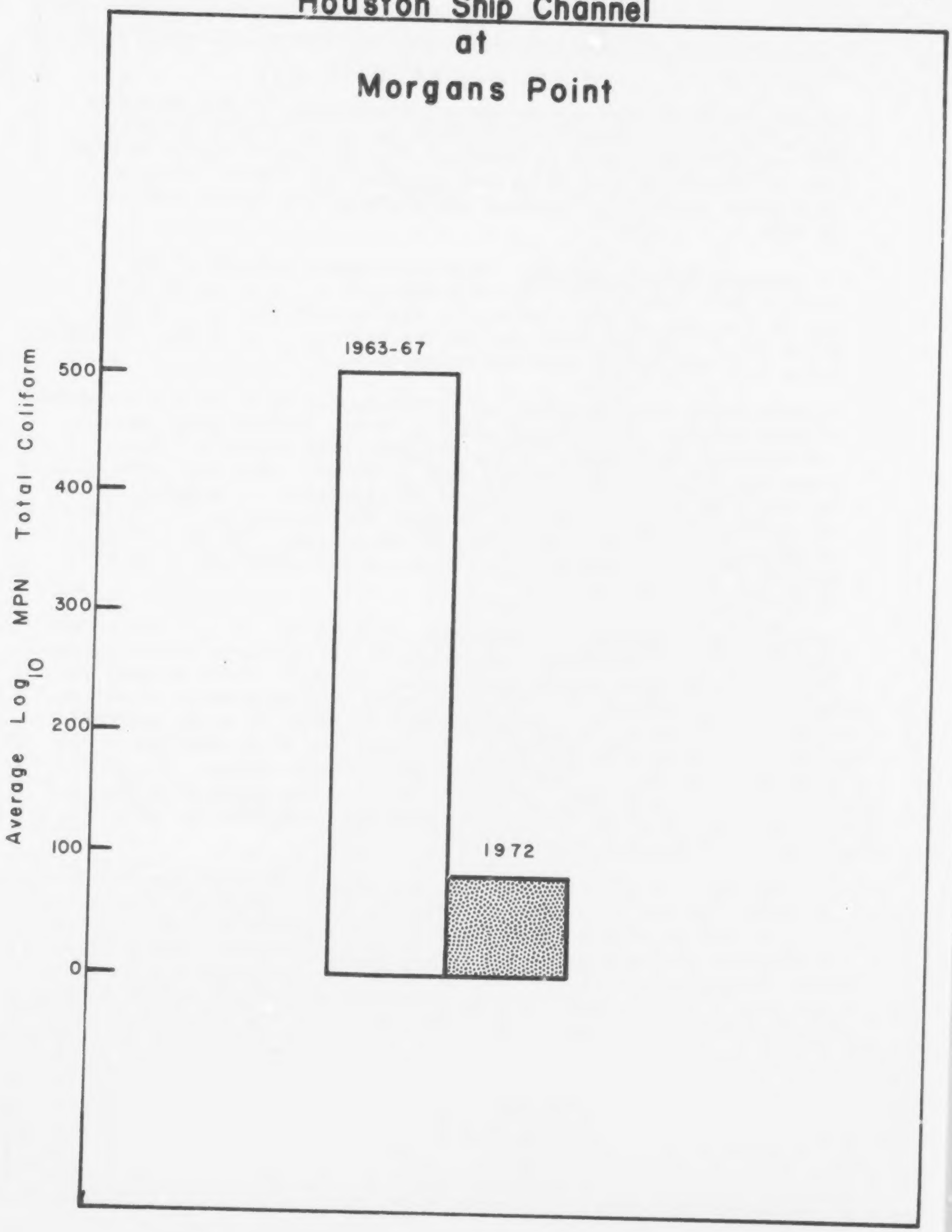
HOUSTON SHIP CHANNEL



6

Houston Ship Channel
at
San Jacinto Monument




Houston Ship Channel
at
Morgans Point
Average Log$_{10}$ MPN Total Coliform
500
400
300
200
100
0
1963-67
1972

representatives and are available from Texas Water Quality Board, Austin, Texas.(2)

It will be noted that a substantial improvement in the dissolved oxygen profile occurred during 1972. We would hasten to point out that even with this improvement, the dissolved oxygen is from time to time zero, and we do not consider the Channel to be in acceptable condition. Further improvements are needed, and will be made.

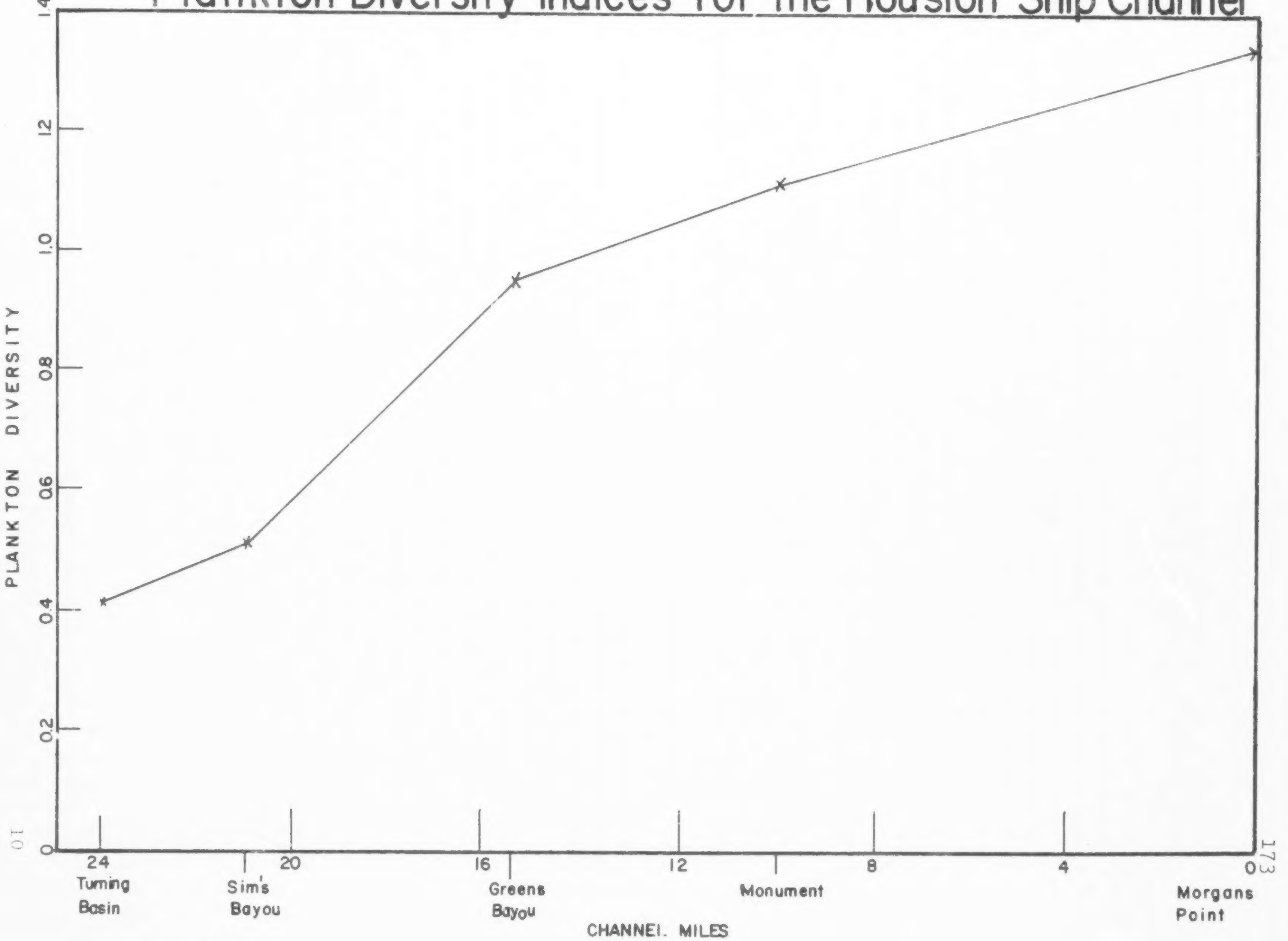
C. Bacteriological Quality. Bacteriological quality of the Houston Ship Channel is still unsatisfactory. This is largely due to the lack of chlorination at the City of Houston's Sims Bayou Plant. Chlorination facilities are currently under construction, with completion expected by March 1, 1973.

Nevertheless, some progress has been made in improving the bacteriological quality in the lower reaches of the Houston Ship Channel. For example, at the San Jacinto Monument (See Figure 4), the geometric mean of the coliform most probable number data show an MPN of 2,044 for the 1972 data,(2) as opposed to a geometric mean of 25,000 for the period 1963 through 1967 inclusive.(1) It will be noted that the 1972 value is only 8% of the 1963-1967 value. Similar data for Morgan's Point shows an MPN reduction from 500 to 80 (See Figure 5).

D. Biological Quality. Commencing in February 1972, the District 7 office of the Texas Water Quality Board has conducted a biological monitoring program of the Houston Ship Channel. This program was commenced on October 19, 1971, following the appearance of shrimp, crabs and fin fish in the Channel approximately 2 miles upstream from the San Jacinto Monument. This was the first occurrence of this type of aquatic life at this point in the Channel for many years. Since that time, fin fish, shrimp, and crabs have been present in the water at this location on every occasion that the district office has sampled.

During the 1972 regular sampling runs made under this program until November, no fin fish, crabs, or shrimp have been recovered at the sample station located 11 miles upstream from the San Jacinto Monument. On the most recent sampling run (November 28, 1972) the best water quality conditions, to date, were measured and marine fin fish and crabs were recovered at this station -- to our knowledge, the farthest point upstream that this type of aquatic life

Plankton Diversity Indices for the Houston Ship Channel



has been noted in recent years. These migrations are indicative of a general improvement of the water quality in the Houston Ship Channel.

In addition to shrimp, crabs and fin fish, the district office has sampled plankton populations at five stations on the Houston Ship Channel in February, March, May, June, August, and September, 1972. The species diversities of the plankton population at the various stations are shown in Figure 6. It will be noted that species diversity increased from 0.4 at the turning basin to 1.4 at Morgan's Point.(5) A species diversity of around 2.0 is generally indicative of unpolluted or natural conditions. These data indicate that the biological conditions of the upper portion of the Houston Ship Channel are generally poor; however, the areas around the Monument and Morgan's Point have shown a marked increase in both number of species and total individuals.

E. Summary Based on physicochemical, bacteriological, and biological data, it has been demonstrated by the foregoing discussion that the water quality in the Houston Ship Channel has been improved by the pollution abatement efforts made. Even though progress has been made, additional improvement is required and will be forthcoming.

IV. JOINT TWQB-EPA WASTE SOURCE SURVEY

Recommendation number 7 of the Galveston Bay Enforcement Conference dictates that the Texas Water Quality Board and the Environmental Protection Agency cooperate in an intensive waste source survey of the waste dischargers to the Galveston Bay complex for the purpose of determining the various waste dischargers implementation schedules for meeting Federal-State water quality standards. This joint effort commenced April 1972 and has progressed in a satisfactory manner (See Figure 7). A complete field survey consists of a preliminary conference followed by a three-day composite sampling program. The preliminary conference is held with a company's technical representatives to orient the sampling team and to gather background data. After a thorough evaluation of the background data, the sample team selects appropriate sampling points and returns to the plant site for the intensive sampling effort. When analytical data from the sampling program is available, a draft of a final report is made. These drafts are jointly prepared by the TWQB and EPA field offices. After review by the joint TWQB/EPA technical committee, the report is finalized, and discussions are held with the discharging industry or municipality relative to the findings and recommendations of the final report.

JOINT TWQB-EPA INTENSIVE WASTE SOURCE SURVEY
FIGURE 7

ENTITY	SCHEDULE			
	CONFERENCE	SAMPLING	DATA COMPLETION	COMPLETE REPORT
Ethyl Corporation	4/12/72	4/17/72	5/17/72	8/14/72
DuPont	4/14/72	4/25/72	5/14/72	9/20/72
Crown Central Pet.	4/2 /72	5/4/72 & 5/7/72	5/17/72	
Sinclair-Koppers	5/3/72	7/10/72	8/2/72	10/20/72
Humble	5/4/72	6/19/72	8/11/72	
Petro-Tex. Inc.	5/8/72	5/15/72	6/8/72	
Shell Chemical	5/9/72	5/30/72	8/2/72	
Arco Refining	5/10/72	5/23/72	8/2/72	
Champion Papers	5/24/72	6/26/72 & 8/15/72	8/14/72	
Southland Paper	5/25/72	7/24/72	8/14/72	
City of Houston (Northside & Sims STP)	5/31/72 & 6/28/72	9/5/72 & 9/11/72	11/72	
Goodyear Synthetic (Rubber)	6/1/72	5/13/72	8/2/72	
Olin Corp.	6/8/72	8/21/72 & 8/28/72	10/30/72	
Shell Oil	6/21/72	10/10/72		
Diamond Shamrock (Deer Park)	6/28/72			
Diamond Shamrock (Greens Bayou)	7/13/72			
Tenneco	7/19/72	9/25/72		
Premier Petro Chem.	7/26/72	10/1 /72		
Phillips Co.	8/2/72			
Rollins-Purle	10/2/72 & 10/12/72			
Charter Oil	10/19/72	10/24/72		
Reichhold Chemical	10/26/72			
Union Carbide	10/31/72			
Union Carbide				
American Oil	11/7/72	12/72		
Monsanto	11/14/72	12/72		
Armco	11/21/72	12/72		

The effort to date has been directed to industries and municipalities discharging into the Houston Ship Channel. As of October 1, 1972, a total of nineteen preliminary conferences with industries and municipalities has been held. Fourteen waste sources have been sampled and two final reports have been completed. The waste sources already surveyed represent approximately 83% of the BOD load on the Houston Ship Channel.

In the interest of reviewing the major waste dischargers first, the intensive waste source survey effort is now being directed to the Texas City area. Preliminary conferences have already been held with the major industries in the Texas City area and sampling is scheduled to commence in December. It is anticipated that the sampling work in the Texas City area will be concluded sometime in January 1973.

With the advent of the 1972 amendments to the Federal Water Pollution Control Act, the National Pollutant Discharge Elimination System was inaugurated. This system is to be administered by the EPA. Provisions are made in the Act for the administration of this program to be transferred to the States if the State program conforms to the provisions of the Act and guidelines to be promulgated by the Administrator of EPA. The Act envisions the EPA providing continued supervision of the program. The status of the transfer of this program to the State of Texas is as yet unresolved.

Regardless of who actually issues the permits regulating the various waste dischargers to the Galveston Bay complex, it is expected that the intensive waste source survey findings will be utilized in the continuing effort of deriving appropriate effluent limitations and implementation schedules.

V. SUMMARY

In summary, programs presently under way are expected to reduce the pollutant load from Galveston Island 72% during 1973, from the Texas City area 90% by the end of 1975, and from the Houston Ship Channel 50% by the end of 1973. It is recognized that this reduction may not be adequate, and joint efforts by the Texas Water Quality Board and the EPA are continuing which will result in continued reductions.

We are encouraged to note that the water quality in the Houston Ship Channel continues to improve. Improvements have been noted in physicochemical measurements, bacteriological measurements, and most significantly by the migrations of marine fin fish, crabs and shrimp into areas of the Channel where they have not been seen for many years.

REFERENCES

(1) Galveston Bay Water Quality Survey (1963-1967). May, 1968. Texas State Department of Health, Austin, Texas.

(2) Stream Monitoring Program Computer Print-Out. 1971-1972. Texas Water Quality Board, Field Operations Division, Surveillance Section, Austin, Texas. Unpublished.

(3) Chambers, Gilbert V. and Albert K. Sparks. 1959. An Ecological Survey of the Houston Ship Channel and Adjacent Bays. Publ. Institute of Marine Sci., Vol. 6, p. 213-250.

(4) Houston Ship Channel Water Quality Data. 1968 and 1971. Texas A&M University, Environmental Engineering Division. Unpublished.

(5) Water Quality Related Trends and Conditions of the Confined Houston Ship Channel. 1972. Texas Water Quality Board, Field Operations Division, Austin, Texas. Unpublished Report by District 7 Office.

MR. STEIN: Before we throw this open for comment, I would like to say, Dick, that it was an excellent report indeed. As you know, I have listened to many State reports and Federal reports through the years. I think this was succinct, candid, and to the point.

Thank you very much.

MR. WHITTINGTON: Thank you.

MR. STEIN: Are there any comments or questions?

MR. ALEXANDER: I have none.

Thank you, Mr. Whittington. We appreciate it very much.

MR. WHITTINGTON: Thank you, sir.

MR. ALEXANDER: Mr. Stein, I would like to call on Mr. George Putnicki of the Environmental Protection Agency. Mr. Putnicki is the Director of our Surveillance and Analysis Division, which is in charge of the laboratory facilities that EPA has in Houston, and I would like for him to report to the conference on what resources have been put into this conference carrying out its recommendations.

Mr. Putnicki.

GEORGE J. PUTNICKI, DIRECTOR
SURVEILLANCE AND ANALYSIS DIVISION
U. S. ENVIRONMENTAL PROTECTION AGENCY, REGION VI
DALLAS, TEXAS

MR. PUTNICKI: Mr. Chairman, conferees, and ladies and gentlemen.

My name is George Putnicki. I am the Director of the Surveillance and Analysis Division of the Environmental Protection Agency, Region VI, Dallas, Texas.

In order to implement the conferees' recommendations for the called conference in the matter of the pollution of the navigable waters of Galveston Bay and its tributaries held at the Rice Hotel in Houston, Texas, on June 7 through June 12, 1971, and reconvened at the Shamrock Hotel November 2 and 3, 1971, a facility was established at 6608 Hornwood in Houston, Texas. This facility has a total area of 13,040 square feet and contains chemical, biological, and microbiological laboratories, offices, storage area, conference rooms, and a library.

Currently housed at this facility are 16 full-time permanent and 4 temporary Environmental Protection Agency professional, technical, administrative, and clerical personnel and 4 full-time Texas Water Quality Board chemists.

With the current complement of Environmental Protection Agency and Texas Water Quality Board personnel, this facility is capable of running the following physical, chemical, biological, and microbiological analyses on a routine basis:

pH, temperature, BOD, COD, nutrients, color, chlorides, cyanides, phenols, sulfates, sulfides, solids, pesticides, coliforms, both total and fecal, fecal streptococci, static bioassay, 27 heavy metals, complex organic analyses, total organic carbon, and total inorganic carbon.

The major pieces of equipment include a gas chromatograph, mass spectrometer, two other gas chromatographs, one atomic absorption unit, one total organic carbon analyzer, one infrared spectrophotometer, and a technicon auto analyzer.

In addition it contains a fully-equipped microbiological laboratory and a biological laboratory with static and flow-through bioassay capabilities. In addition to the fixed laboratory equipment, this facility also operates a mobile biological laboratory equipped for flow-through bioassay. For use in stream and estuarine sampling, the facility operates a 25-foot Bertram boat powered with a twin 110 horsepower inboard/outboard engine, has an 18-foot flat-bottomed boat powered with a 25 horsepower outboard engine, and has a 16-foot Crestliner powered with a 40 horsepower outboard engine.

G. J. Putnicki

The facility is utilized as a joint Environmental Protection Agency-Texas Water Quality Board facility. Sampling crews, that Dick mentioned earlier, conducting intensive point source surveys consist of one EPA and one Texas Water Quality Board staff personnel. Sampling equipment, vehicles and boats are all shared by the two agencies. The analytical laboratory load is shared by the two agencies and the data generated is jointly evaluated.

In addition to the water quality monitoring activities being conducted at this facility--I recognize this is a water conference but I feel I should mention this--it is also the focal point for a coordinated city, county, State and Federal ambient air monitoring activity. Personnel from the facility assist in the cooperative project to operate an air monitoring trailer in the downtown Houston area. The air monitoring trailer is equipped to measure NO_2, carbon monoxide, suspended particulate matter, and plans are under way to add equipment capable of measuring ozone. EPA facility personnel also assist State and local air pollution control personnel in calibration and maintenance of other ambient air monitoring equipment located in this area.

It is anticipated that the current Federal-State waste source surveys being conducted at this facility will be expanded to include similar intensive point source and intensive basin surveys in other high priority basins in the State of Texas. This facility's personnel will continue to respond to emergencies such as major oil and hazardous materials spills, provide technical assistance to State and local agencies, and support other ongoing EPA-Texas Water Quality Board programs.

The operation of this facility is considered unique in that Federal, State and local personnel are pooled to conduct the necessary field investigations, laboratory analyses, and data evaluations to efficiently fulfill our responsibilities as recommended in the conference held last year.

This facility will be formally dedicated in January 1973. I would like to take this opportunity to extend a welcome to those in attendance to visit this facility and see your tax money at work.

In closing I would like to introduce the EPA facility manager, who is in attendance, I hope, Mr. Malcolm Kallus.

There he is.

Thank you very much.

MR. ALEXANDER: Thank you, Mr. Putnicki.

MR. YANTIS: Mr. Chairman, I wonder if I could ask a question that has bothered me for a number of occasions?

MR. STEIN: Yes.

MR. YANTIS: Speaking of tax money, we have a State Health Department laboratory which we have historically used and which, of course, works on a cost basis for the Water Quality Board. We have used in this area the tax-supported laboratory of the city of Houston, which, with a predictable workload, can handle a great many things. The Texas A&M system has a fairly major laboratory facility down somewhere around the LaPorte area and they look to us for a great deal of their workload, which, of course, supports them financially and without our workload and our payment for the analyses they have made they could hardly exist. We have this new Federal laboratory.

I have some casual curiosity as to how are all of these coordinated to make sure that our tax money is used efficiently, that we simply do not have more laboratories than we need?

MR. STEIN: Do you want to try that, George?

MR. PUTNICKI: Sure.

As far as our facility is concerned, I think that I can very well say it is one of the best coordinated Federal-State activities that we have going on. You need a program when you walk into that laboratory because you don't know a State man from a Federal man. This is the kind of an operation

I think that makes some sense instead of duplicating a bunch of effort where we are going two different directions. We are working together on a problem and I feel very good about the fact that we are doing the job and doing it with the least cost.

Now, the other facilities you mentioned, I am familiar with the A&M portable laboratory facilities down around Morgan's Point. I think they are excellent facilities. They have their specific projects that they are working on, many of which, incidentally, are funded by EPA through the research programs. They have one function; we have another function at Monterey Park.

I think that we can in fact justify a large laboratory in this metroplex where we have a couple of million people or several million people and along with the people come environmental problems.

MR. STEIN: Are there any other comments?

I would like to associate myself with what Mr. Yantis said. I have always been puzzled. I recognize that you have done a job in that laboratory you have of integrating the people there, but there was another thrust to Mr. Yantis' question.

This is not the only problem because you are not the only laboratory and we always have this question of various people having laboratories and getting them at various stages and the question, I think, that is vital for all of us is the coordination of those laboratories. I think that is something we have to pay increasing attention to. As a matter of fact, this has been acutely brought home to me. Very often when we have a national program where we are gathering evidence, I often find that getting the same sample to different laboratories gets different results. We have to put in a crash program, so that when these fellows split a sample of the same material between one laboratory in one part of the State and another in another part of the State, or one in one part of the country and another in another part of the country, they come up with the same answer.

But I think Mr. Yantis is speaking to a very, very fundamental problem. So when we set up any facilities, in order to get the biggest bang for the buck out of our tax dollar, we have to work out a way of getting them integrated. I know that is difficult, and that is certainly part of what we are trying to do in our Federal programs by meetings like this with the State. Maybe everyone isn't happy, but I suspect you are going to have to do the same thing with the laboratories in order to get them together and not fritter away tax funds.

MR. ALEXANDER: Mr. Stein, with your permission I would like to comment on that.

MR. STEIN: Yes.

MR. ALEXANDER: This is a concern to many, many people, and as a matter of fact, right now it is a great concern to Congress and OMB. As a matter of fact, they have impounded all laboratory construction funds until there can be a complete evaluation made of the many laboratory facilities that are available, and there are not going to be any more new ones, and possibly there are going to be a number closed to get these efficiencies that we need with the tax dollars.

I think Mr. Putnicki hesitates to say because I am on him all the time about it. We have this problem within the region and we are making great progress towards overcoming it.

I would say that the Houston laboratory operation with the State of Texas is the most efficient within this region, and without bragging it is the most efficient within EPA.

MR. PUTNICKI: Glad you said that.

MR. STEIN: Great. That shows you, with the concern for the tax dollar and where we are, I know I am in the State of Taxes now. (Laughter)

MR. PUTNICKI: Mr. Stein, I think that this internal laboratory problem of EPA is not exactly what Mr. Yantis had reference to. He had reference to the university laboratories, other State laboratories.

MR. STEIN: Yes.

MR. PUTNICKI: And I think that these are all justified. They each have a specific function, a different function.

I think just very recently you saw the data that was obtained by Texas A&M University from their survey. This is not a duplication of what we are doing. This is complementing or supplementing the work that the Texas Water Quality Board and EPA are doing in the way of sampling on the ship channel and Galveston Bay.

MR. STEIN: I appreciate your point of view. I wish I could be as certain and as optimistic as you are.

Thank you.

MR. ALEXANDER: Thank you, Mr. Putnicki.

MR. YANTIS: George, after you give me a set of samples and your analyses I will send them out to Edna Wood back there and find out if you did them right. (Laughter)

MR. ALEXANDER: Mr. Stein, I would now like to call on Mr. Ken Kirkpatrick for a report on the grants program that Mr. Yantis was interested in earlier in the city of Houston.

Mr. Kirkpatrick is Director of the Office of Grants

Coordination in Region VI of the U. S. Environmental Protection Agency in Dallas, and I think he can give us a current report as of this morning as to where this stands.

KENTON KIRKPATRICK, DIRECTOR
OFFICE OF GRANTS COORDINATION
U. S. ENVIRONMENTAL PROTECTION AGENCY, REGION VI
DALLAS, TEXAS

MR. KIRKPATRICK: Thank you, Mr. Alexander.

Mr. Chairman, conferees, ladies and gentlemen.

The Office of Grants Coordination of the Environmental Protection Agency, Region VI, in conjunction with the Texas Water Quality Board, is responsible for administering the program that provides grants to municipalities to construct necessary treatment facilities. I think this program is more commonly known as the P.L. 660 program. The city of Houston has participated in this program in the past and currently has 10 active grants with a total project cost of $19.2 million. Of this number, six grants were made on March 29, 1971, which contained special conditions requiring certain action by the city of Houston before payments would be released by the EPA. These stipulations pertained to:

1) Expediting an Infiltration Abatement Program,

2) Increasing the drying facilities at the Northside Sludge Disposal Plant,

3) Updating the city's master plan for sewer facilities, and

4) Developing an industrial waste control ordinance.

Recently, the Environmental Protection Agency notified the city that the intent of these conditions has been satisfied and payments in excess of $4 million are being released today.

In May 1972 two grants were awarded to the city with the provision that advanced levels of treatment be added to these projects when waste load allocations pursuant to Recommendation No. 14 of the Galveston Bay Enforcement Conference are developed. This same condition has been applied to grants for 12 other communities in the Galveston Bay Enforcement Conference area.

The city of Houston submitted three applications to the Texas Water Quality Board in August 1972. To date one of these has been received through the Water Quality Board by the Environmental Protection Agency. The total project costs for these works amounts to $8.5 million. The city has notified the EPA that three additional projects were approved by the Houston-Galveston Area Council of Governments in October 1972 and applications for grant funds are forthcoming. These works have an estimated total cost of $13.4 million. Reportedly, although I don't have all the details here, eight other projects have been formulated with anticipated submittal dates in 1973 by the city of Houston. The total cost of these facilities is estimated at $27 million.

Several communities have received grant funds to comply with the Texas Water Quality Board Order 69-9A, which requires advanced waste treatment in the Clear Lake watershed. Clear Lake City, Houston, Gulf Meadows, League City, Nassau Bay, and Webster have received construction grants for tertiary treatment which has either been completed or is under way having a total cost of $756,000.

Thank you, Mr. Chairman. This concludes my report.

MR. STEIN: Thank you.

Are there any comments or questions?

Mr. Yantis.

MR. YANTIS: Ken, do I understand that of the works that have been undertaken by the city of Houston and which were eligible for reimbursement under the P.L. 660 program, I am talking really about payments on projects that were due and ready, that Houston is now up to date on all the money, let's say, owed by the Federal Government or is there still some more?

MR. KIRKPATRICK: No, sir, I believe this brings them up to date as of this day.

MR. YANTIS: I surely thank you and I know that the city of Houston thanks you, because it is most necessary that these funds be made available if work is to proceed and continue.

You mentioned Clear Lake and I do have a question. I will have to ask some of my own staff also. But a few moments ago one of the city councilwomen or city council persons, depending upon your persuasion, from Nassau Bay asked me a question as to the enforcement of this Order 69-9A.

Now, all of you will know that the Board sought futilely for a long, long time to bring about the creation of one or more regional systems in order to preserve Clear Lake. There was great difficulty in getting adequate local cooperation. There was difficulty in getting approval of the various kinds of plans that were made by the various planning review bodies. There was disagreement between the Federal and State Government over the definition of tertiary treatment.

And during all of this time, which went on for some few years, the problem around Clear Lake was simply not improved because the sewage treatment plants did not know whether to go tertiary, what level of tertiary, or wait and join a regional system or whether a regional system would ever exist.

Well, part of the discussion, the technical discussion, revolved around whether a 5 ppm BOD type effluent with some phosphorus removal was needed or whether a 12 ppm BOD type effluent as suggested by the State was needed, and we picked that because it was a presently-proved simple form of add-on waste treatment that could be done with minimum dislocation.

There was created, after discussions with the Federal Government, an investigation of Clear Lake and a mathematical model to try to show mathematically the level of waste treatment that we would have to get if we were not to have a regional system which appeared to be unreachable. By the way, that mathematical model, which is essentially complete but there is some additional work being done on it, showed some rather surprising things which later on we can show. In effect it shows that the interchange of water from Galveston Bay is so overwhelming that what puny little man does to Clear Lake is almost of no importance. The bay sloshes in and out and that controls the quality in the bay.

However, following the dictates of my freshman chemistry which always said if a little is good a lot is better, I guess it is still true that if you have got too much waste treatment you haven't been hurting a thing, though you may have wasted some money.

But the point I was getting down to, the enforcement of Order 69-9A has been dependent almost entirely upon the Public Law 660 grants in fact being made to the 20 or 30 sewage treatment plant owners in that area, and I do not know at the moment, though maybe you or the staff does, has there been full technical agreement as to what effluent quality we are designing toward and have Public Law 660 grants become eligible around the lake to be made without any restrictions at all?

In other words, can we now move out and expect the grants to be made or are there still things to be resolved?

MR. KIRKPATRICK: To my knowledge of those projects that have come to us in EPA through your office, the requirements of 69-9A are being met as it was prescribed by the Board, and their advanced waste treatment and whatever add-on is made that may have been necessary to comply with that order are being funded as part of the project.

MR. YANTIS: O.K. Dick probably has more information than I.

MR. WHITTINGTON: Well, I have no specific information relative to any particular grant application.

With respect to the 5-5 12-12 difference of opinion, this, of course, was to be resolved by the mathematical model and then the study pursuant thereto, and this, as you previously pointed out, has not been totally completed and the matter still is at the moment unresolved. An extension of time has been granted relative to the enforcement of this thing until the conflict can be resolved, but hopefully this should be shortly.

MR. STEIN: Do you concur in that?

MR. KIRKPATRICK: Yes, that is my understanding of it.

MR. ALEXANDER: Ken, there haven't been any grants held up because of this conflict, though, have there?

MR. KIRKPATRICK: No, there have not been.

MR. YANTIS: You mean not lately?

MR. KIRKPATRICK: No, no, not lately. (Laughter)

MR. ALEXANDER: They are not now--

MR. KIRKPATRICK: These are being processed in accordance with what Dick has indicated here and with the 69-9A Order.

MR. STEIN: You are going to have to know what you are going to design to.

Let me kind of try to bore in on this question and maybe Dick and you can answer it.

Do you think that the result of the mathematical model will lead to an answer one way or the other or are you still going to have to kick this around?

MR. WHITTINGTON: Well, we have, at least at staff level, I think, agreed that we would abide by the findings of the study should everyone be convinced of the validity of the study. Of course the whole conflict revolved around two things: One, the level of BOD removal which would be required, and secondly, the phosphorus removal issue as to--I think this did not necessarily involve the grant program, but the level of phosphorus removal has, of course, surfaced as to whether or not the removal of phosphorus from the effluents discharging into Clear Lake will actually result in an improvement in the eutrophic condition of Clear Lake because of the large exchange with Galveston Bay water which occurs.

MR. STEIN: No, I know what the issue is, at least I am certain that I know what the issue is. But the question that I have--obviously the decision you are going to make is going to affect the design both on BOD and phosphorus; not only design, it is going to affect the cost.

MR. WHITTINGTON: That is correct.

MR. STEIN: Because if you go up higher the costs increase very rapidly.

The question that I have, again this is a real fundamental question and I would like to hear from the EPA too, are we satisfied that we are going to abide by the results of this technical study and mathematical model in the Clear Lake area or do we have some policy or other kinds of considerations beyond the mathematical model which we may not be sure of but we are going to have to go beyond that to resolve this question?

MR. WHITTINGTON: Mr. Stein, Mr. Teller and myself met with Mr. Matthews and others of EPA-Dallas and it was agreed at that meeting, as I said, at staff level that in the 5-5 12-12 controversy we would all abide by the findings of the mathematical model.

MR. STEIN: Is that right?

MR. KIRKPATRICK: Yes.

MR. STEIN: Well, say this for the record.

MR. KIRKPATRICK: Yes, for the record, this is essentially the agreement that we have reached.

MR. STEIN: All right. Then that is great. I think what we have to do is we have got a methodology, we are waiting on the results and you are going to get the answer.

Now, when will this be completed?

MR. KIRKPATRICK: Would you like to speak to this?

MR. WHITTINGTON: I believe the timing is 6 weeks.

MR. STEIN: Six weeks from now we should have an answer one way or another?

MR. WHITTINGTON: That is as my memory serves me.

MR. STEIN: That is close enough. All right, thank you.

MR. YANTIS: Upon that agreement grant applications from that area would be processed on whatever routine basis was enforced at that time?

MR. KIRKPATRICK: Yes, sir.

MR. YANTIS: O.K. Thank you.

MR. STEIN: Thank you.

MR. ALEXANDER: Thank you, Mr. Kirkpatrick.

MR. YANTIS: Did the lady from Clear Lake or Nassau Bay have any additional questions?

MS. WADE: No, but I have a comment. May I--

MR. STEIN: We have to get you on the record to hear you.

Do you want her to--

MR. YANTIS: Yes, I would certainly like to be able to listen to what she has to say.

MR. STEIN: By the way, come up here and identify yourself for the purpose of the record.

JOAN G. WADE, ALDERMAN
CITY OF NASSAU BAY
TEXAS

MS. WADE: I am Joan Wade. I am an Alderman from the city of Nassau Bay. You probably noticed me whisper to Mr. Hugh Yantis, to Mr. Ed Lee of the EPA, and to John Latchford, because I keep hearing you talking about determination of standards based on a mathematical model that won't be available for 6 weeks. We have had advanced waste treatment in operation since April of this year and our lab tests are showing less than 3.0 ppm BOD, less than 1.0 ppm total suspended solids, and I believe we have been down to about 1.6 phosphorus. I don't even hear you mentioning phosphorus now.

However, the standards originally under 69-9A were 12-12-1 and EPA was 5-5-1. What happened to phosphorus? And why can't we meet these standards? We are already doing it.

MR. STEIN: They did mention 5--

MR. YANTIS: The debate had to do with the fact that the State order adopted after 2 or 3 years of public hearings, and these are things I said a year ago or more, after a great deal of judgment evaluation by all of the people involved in writing the order, especially judgment concerning the kind of advanced waste treatment that was readily and reasonably available and fillable and operable at that time, the judgment by the State was that 12 BOD, 12 suspended solids, and 1.0 ppm phosphorus removal would probably, because there was no way of being certain, preserve Clear Lake as the people wanted it preserved and this was the order finally adopted by the Board.

The thing that distressed us, as we said earlier, and we are not trying to rub salt in an old wound, was that shortly after the issuance of the State order, which had been known to the Federal Government throughout its long period of development, they decided that they would review plans on the basis of 5 BOD and 5 suspended solids and 1.0 ppm phosphorus or they would not make a Public Law 660 grant. We felt that they were in error and neither side wanted to give way. We felt that there was simply no need for going to the lower values and the Federal Government felt that, well, they were certainly possible whether there was need or not and so they insisted on them, and this was coupled with the fact that there had been efforts to make regional sewer systems in that area.

So we were faced with various informal or formal judgments that said grants for sewage treatment plants should not be made because there is going to be a regional sewer system some day in this area and that is where the grant money ought to go and we don't want to fund temporary plants. So they were thought to be not even eligible to get a grant.

Then at other points it was simply that unless they are designed to 5-5 they don't get a grant and we felt this was unnecessary and a waste of money.

So the idea came about of making a mathematical model to try to show technically what actually was needed, and this was a technique which was simply not available to us during all the development of the order; we didn't have the money, we didn't have the mathematical model or anything else.

Some months ago it became possible to make a mathematical model and to do the other technical support work, much of it was biology and so on, to tune up the model and to try to show whether it was a good model or a bad model. And this is the thing that was to resolve the design problem and you simply can't design a sewage treatment plant efficiently until you do know the levels to which you are designing.

Now, the thing that I said, and this is on the most preliminary basis, we have never relaxed the requirement of 1.0 ppm for the phosphorus content of an effluent, because as a judgment matter we knew it could be met fairly reasonably by techniques available. We also knew that it might not be met all the way but we weren't sure, nobody was sure, and apparently from your figures you are getting down to about 1.6 but you are not necessarily getting down to 1.0.

The other thing, though, that the model is about to show is that the phosphorus coming in from Galveston Bay is so absolutely overwhelming that it actually makes no difference whether you take out phosphorus or not. It probably says the same thing about BOD.

So if all we are dealing with is public health, then all you have to do is a real heavy job of chlorination. But if you are dealing with the eutrophication of the bay, we come up against the fact that Galveston Bay and the tide appear to control Clear Lake, not what man is doing. So this in a technical sense--and I am speaking before all the facts are in--really shows that maybe Clear Lake is exactly the way it is going to be no matter what anybody does to it.

But on the other hand, whether the Board feels that it ought to relax its order, I can't speak for the Board, I don't know. But we have gone into a program that from the esthetic standpoint, from the community acceptance standpoint, most of the people around Clear Lake want Clear Lake to be a desirable body of water which they can use for water recreation without even worrying about it, without being offended in any way by it. So I doubt that there will be any opposition to tertiary treatment on the basis that it certainly is going to be good for the bay but is not necessarily going to be the controlling factor in the bay, by which I mean Clear Lake.

But anyhow, my comments arise from the fact that the lady's question said when are we going to enforce the order which does require people to build tertiary treatment plants. And my response is whenever the Public Law 660 funds are available without limitation, because I don't think that the order would be feasible or reasonable to have all of this work done without grants if in fact grants are in the culture of our time.

And so this complicated answer to a relatively straight forward question is that the order is about to be enforced because grant money is about to be available, subject, of course, to various statements that have been made by my Board and by some of the--at least Senator Bentsen's office. We are going to get about half the grant money we have been getting in the past, and this is not exactly helpful to the State as a whole.

I hope I haven't got everybody more confused now than they were when we started.

MR. STEIN: Well, I think it was a technical discussion. Really it is very clear; if you read it in the record I am sure it will come out. But I think Mr. Yantis put this thing forward. Let me try this at the risk of doing it again.

I think what we have said is that we have a mathematical model to resolve an alleged difference between Federal and State governments. Now, whether one is right or the other is right, I think the facts will have to show that, and it is a question here of whether more or additional advanced waste treatment is necessary. I suspect, Hugh, that the preliminary determinations you have indicated are right--that the channel dominates Clear Lake.

Now, I think the sole question you have to get here, as we have in other places, and this hasn't come up yet, is whether you are dealing with a question of eutrophication of the whole channel and whether this is one of the bodies of water that you have to be worried about phosphates in the channel. I don't know that you are or not. But if you are not, you may be home free in Clear Lake in putting in additional treatment on what we have said.

Now, the problem in dealing with phosphate removal or other advanced waste treatment techniques is that sometimes you get involved with conceptualism, policy, emotionalism, or something of that kind. What we have here is parties that cannot agree. What they do agree on is a methodology of checking something out and that both sides are going to abide by the results. We have a situation here where the State and the Federal Government are about 6 weeks away from touchdown. We will get the results, and I think as far as I am concerned--and I think Mr. Yantis, and I don't want to speak for Mr. Alexander but I hope he will join with this--that as the results of this mathematical model will turn up and all sides are agreed in advance to abide by the result, this will settle the ball game.

MR. YANTIS: Murray, of course everybody knows that a computer is basically an idiot.

MR. STEIN: Right.

MR. YANTIS: It can only count very fast, that is all it can do.

Now, all the highways in Texas are designed by computers and when they are built they are too small when they are finished. It doesn't really prove that a computer was not useful, but it does prove that it is not exactly a genius.

We always would add to whatever the computer shows us an element of judgment and the human privilege of making decisions and policies. Remember, the population is going to grow around Clear Lake.

I wouldn't have anyone sit around and wait for the Board to withdraw its order or amend it or weaken it, because it is probably reasonable on the basis of judgment and experience, it is probably a desirable and reasonable order. It may give us a little more treatment than the computer says we need, but I just don't think that the Water Quality Board has surrendered its human judgment to a computer as yet.

MR. STEIN: I hope I didn't suggest that. I suggested the issue here, as I understand, was between 12-12-1 and 5-5-1.

MR. YANTIS: That is correct.

MR. STEIN: And presumably the methodology that you are going to come up with would resolve that. I am not suggesting that any result coming up from this methodology would result in a relaxation of the 12-12-1.

MR. YANTIS: The only thing I really want to point out is that we are approaching the time, apparently, when grant funds will be available to bring about the completion of Order 69-9A.

MR. STEIN: This can be off the record.

(Off the record)

MR. STEIN: Let us take a 15-minute recess. Then we will come back and conclude.

(Recess)

MR. YANTIS: Mr. Stein has just asked if I want to make a statement and the answer is no, I do not. (Laughter)

Thank you, Mr. Stein.

Mr. Stein, I do want to make a statement, really, and I would include Mr. Alexander in these remarks.

Having known you for a number of years and been associated with you very closely in this series of hearings, and having known Mr. Alexander since he assumed his position up in Dallas and is now a conferee on this particular conference, it really has been a pleasure, a rewarding experience, and I mean that quite sincerely, to deal with, discuss and evaluate problems with men of such undoubted good will and sincerity, and I want to thank you both and compliment you both for the extremely fine attitude and work that you have brought to this conference.

MR. STEIN: Thank you.

SUMMARY

BY

MURRAY STEIN

MR. STEIN: I think we can summarize the meeting rather rapidly.

You know, this is a distinct pleasure for me in this summary because what I would like to use is the paper that Dick Whittington of Texas submitted. I think he said it as well and as tersely as it can be said here, and let me just read this.

This is just two sentences right from his paper. And it is No. III in his paper. What he said, and I think this summarizes the situation:

> At the outset, the water quality in the Houston Ship Channel remains unsatisfactory. Nevertheless, improvements are becoming apparent.

And I think this is correct.

Now, since we have this as our text, if the water remains unsatisfactory and we can see that improvements are becoming apparent, how do we move under the new law to the next stage in getting these further improvements so we can change that sentence? And the key in the goal we have to get to is "The water quality in the Houston Ship Channel is satisfactory." That is what we have to say.

Under the new law and the new procedures, the technique, it seems very clear, is that the municipalities and the industries are going to require a permit. Each and every one of them for the point discharges is going to require a permit. The law authorizes us to allow the State of Texas to issue these permits, but if they don't we are going to have to issue them ourselves.

I think we all should be agreed that if we are going to look at the purpose and intent of the new law, and the way we have viewed this that the primary rights and responsibilities for pollution control rest with the State, that the most desirable thing and the way to handle this is for the Federal Government and Texas as soon as possible to get together so we can get the necessary papers and Texas can issue the permits to the dischargers into the Houston Ship Channel and that these will have the full sanction of the Federal law when Texas issues these permits. If we go back, though, we have to, I think, come up with a program that is going to assure that when the conditions of these permits are carried forward that we can say that the condition of the waters of the Houston Ship Channel are going to be satisfactory.

In order to do this, there is going to have to be an allocation of a discharge load among the various dischargers into the Houston Ship Channel which may require some deep soul-searching and some very heroic action, possibly, on the part of the cities and industries here.

The Houston Ship Channel is like several other places in the country, one of the places where you have a relatively slack body of water, big city, other urban development, and a lot of industry all discharging into the same body of water. If we are going to create satisfactory conditions, the kind of waste loading will have to be carefully apportioned among all the various dischargers concerned and in order to meet that very tight apportionment that you have, the kind of treatment required will be at the very forefront of municipal and industrial treatment.

As another part of our activity, we are coming up with guidelines, effluent guidelines, for municipalities and for the various industries in the country. I would suspect in the Houston Ship Channel that certainly as a minimum the very best that we put out in these guidelines will have to be met, and in many cases these results will practically have to be exceeded in order to meet these requirements. I would suggest, and I think that we have a rather excellent working relationship with the State, that we get a program under way where the permits to be issued by the State of Texas, or whoever is going to issue them, individually or in the aggregate, can assure that we are going to meet certain minimum requirements in the Houston Ship Channel.

I think there is another aspect to this program in dealing with these permits that may be overlooked. Whether the State or the Federal Government issues these permits, I think a violation of the permit, if you violate one now, you are going to be in violation not only of a State law but a Federal law as well, and there is going to be a considerable measure of checking on whether you are in compliance or not. This is one of the aspects of the program that you have to consider. I think pollution control is developing this way.

Perhaps you can use one or two analogies in this. One I used before, it is like either the water company or the electric company or the telephone company. If their service breaks down everyone knows it and there is a big protest. That, I guess, is what is going to happen once the permits get issued, because everyone is going to know if you are not operating satisfactorily. It is not just a question of getting these very advanced facilities in. You are going to have to run them.

The other analogy I use, and this is the kind of discipline that many of us don't have, we are going to go public on this. Now, I know when all of us make a mistake or I make a mistake in the office, very often I can crumple up a piece of paper and throw it in the wastebasket and start over again, and no one except myself knows I made that mistake. But in the environmental field, particularly in a field like this where we have a lot of people together, once we have got this permit out and once you have made the mistake, this is going to be like being in your football stadium here and going out for that pass when you have got a clear shot for the touchdown and that pass goes through your arms. Every guy in that stadium and a hundred million people on TV, maybe, are going to know you goofed. This is what I think we have to keep in mind with this program.

I think that through the conference, through the Galveston Bay study, through the joint work with our lab, through the continuing work with the region and the State, we have a firm basis and understanding with the State on the factual situation. I would like to call everyone's attention to that--that on the facts I don't believe there has been a scintilla of difference between the State and Federal authorities. There is complete agreement on the facts.

The next step in working this out, since we now have a strong regional concept, is for the State to work with Mr. Alexander and his group in the regional office. Of course, we will have to work out a system whereby we come to a pretty detailed agreement on how we are going to approach Galveston Bay, how the allocation of the waste loadings are going to be made, and then get on with the issuance of the permits to the various industries and the municipalities involved. I would suggest to industries and municipalities, if you haven't done this already, that they get in touch with either Mr. Yantis, the regional office, trade association, whomever they deal with, to get the guidelines for their industries and begin to think in terms of what a fair allocation is.

One last point which is possibly going to compound this, but we all have to think about this. I don't think we can think of the Houston Ship Channel and the Houston area, as strong and as powerful and as progressive as it is, as the end of the road. I think the industry, the population is going to need some room for expansion, and when we think in terms of room for expansion there has got to be some kind of leeway. If we use every ounce of the allowable effluent limitations, then you are going to be faced with the fact that any new industry that is going to come in is going to have to practically go to a completely closed cycle. This may be the thing that you may have to think to now. But even if we do that with the industry you are not going to go closed cycle, at least not in the foreseeable future, with municipal wastes, and the population is going to grow if the industry is going to grow. So you have to not only design a program that is going to abate the pollution in Galveston Bay, get those waters into satisfactory condition, but we have to provide a cushion for future growth and future expansion.

Now, I am confident from listening to the technical staff and from my association with Mr. Yantis and Mr. Alexander that you have the personnel in the State and in our regional office to accomplish this and go forward with this goal. I hope this will be resolved very soon and that we can go forward with the program.

I know there are certain industrial and municipal representatives here. I think it is to everyone's advantage to resolve this soon.

We have a statutory date in that law where you have to comply with the conditions of the permit not later than July 1977. If we come up with a resolution of that now, you have got a pretty good bite in order to do that. However, if you wait a year or a year and a half or more before the Federal Government and the State may resolve differences or before you get a permit, instead of having 4.5 years to do something you may have 3 years or less. This is going to mean the difference between operating and trying to get to the top kind of treatment on a crash program or a program where you are going to be able to proceed at a more regular pace, and you are going to have some cushion for inevitable little mistakes or setbacks.

But I think it behooves us all for the Federal Government and the State to come to this agreement rapidly and for us to come to an agreement with individual point sources, individual industries, and individual plants as soon as possible so the permit can be issued and you can get working with as much leadtime as you possibly can get under the law. Every day we delay means a shorter time fuse because the Congress has set that end date already. That is enshrined in the law.

This is the message I would like to leave. I think with the good will we have of the State and the region we can do it. We can accelerate that if we get the cooperation and the good will of the industries and municipalities involved.

With that I would like to thank you all for participating, and I hope we are on our way to a clean Galveston Bay.

We stand adjourned.

(Whereupon, at 12 o'clock the hearing was adjourned.)

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